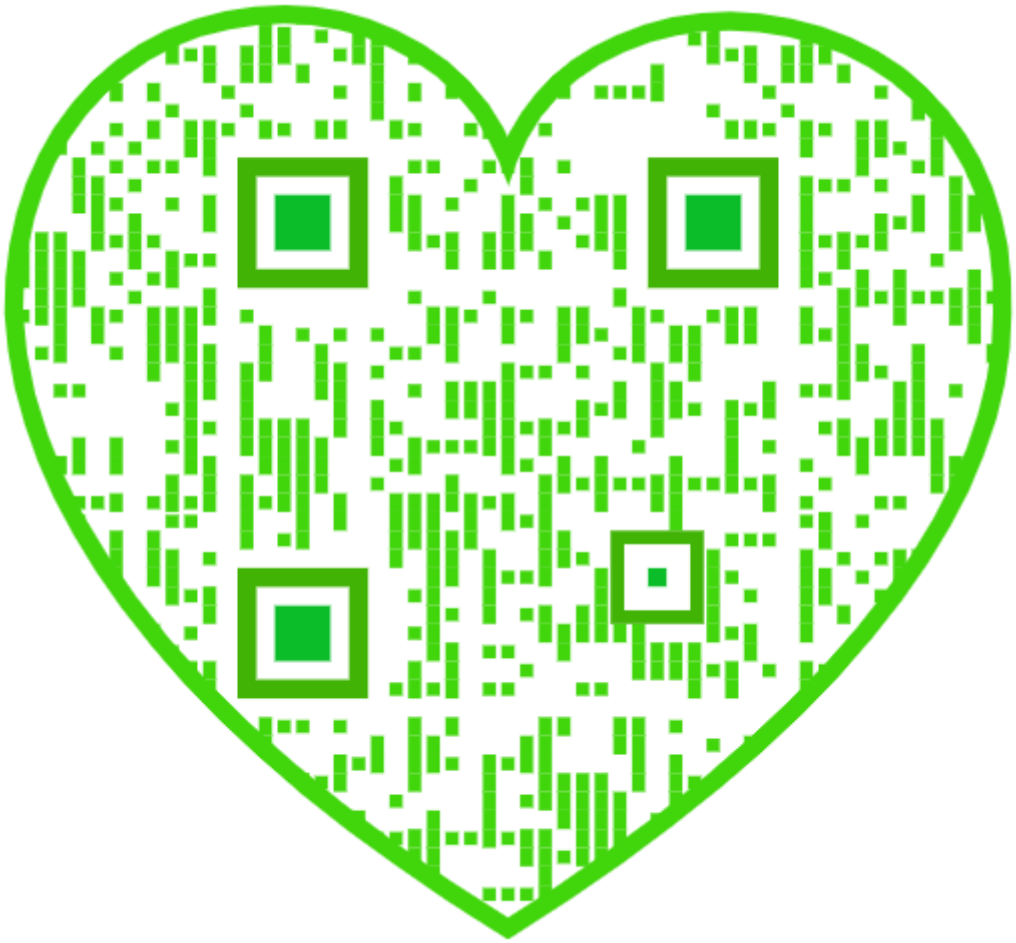

FIRST PRINTED SHEET.

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GUTENBERG,

AND

THE ART OF PRINTING.

BY

EMILY C. PEARSON,

AUTHOR OF "RUTH'S SACRIFICE," "THE POOR WHITE," "PRINCE PAUL," "OUR PARISH," ETC.

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TO THE GIFTED INTELLECTS,

WILLING HEARTS,

AND DEXTEROUS FINGERS

ENGAGED IN MAKING THE GREAT ART

A BLESSING TO THE WORLD.

PREFATORY.

PRINTING has been styled "The telescope of the soul." As the optical instrument brings near and magnifies objects remote and invisible, so printing puts us in communication with minds of the past and present, and preserves the thoughts of this age for future generations.

But no one of the good and great of the past was permitted to lead the way in embodying thought on the printed page, save the wonderful man sketched in this volume. Out of a full heart of reverence, then, it is most fitting to embalm the memory of Gutenberg.

While musing on certain old archives touching the history of printing, it was suggested by literary friends, that we weave a memorial narrative of the chevalier and artisan honored in bringing the art to light. Accordingly we engaged in the work, having culled the most authentic warp and woof within reach.

Devised in the quiet of old libraries, and in the hush of peace, our little history finds itself heralded by the march of armies, and the clash of empires. War, ever to be deplored as the author of almost unmingled evil, has turned attention to the cradles of printing, — Strasbourg and Mentz. Directly we recognize them, shake hands, and are at home with those glorious old Rhenish cities, made famous for all time.

It is an interesting fact that the final completion of the world-famed Minster or Cathedral of Strasbourg, closely preludes the time when the art of printing had its rise. Earth's loftiest spire may well mark the place where Heaven gave the greatest treasure-art to man.

Pains have been taken to harmonize the accounts of early printing by various credible authors, and when in doubt from conflicting statements, for safety and defense, we have taken shelter under the wings of the encyclopædias.

Led on by the romance of the broken betrothal, and afterwards most happy marriage, we love to linger over the art devised and cherished in the sanctity of the inventor's home. Nobly did the Lady Anna exercise her "right," and to her, almost equally with her husband, are we indebted,

since she cheered his way, inspiring courage in his work.

In a cell of St. Arbogast, our hero found a quiet retreat for some of his secret experiments; never was an old ruin turned to better account. The Library and Scriptorium of the great Cathedral also paid tribute to this man's genius. But magnificent things were accomplished in Mentz, after his unparalleled overthrow in Strasbourg. "Organizing victory out of defeat," he took into partnership the two men of the time best fitted for the purpose, and engaged anew in his chosen vocation. One is startled at the sequel of this fraternal alliance in the estrangement of those so knit together in pursuit and interest; but the stupendous enterprise of the firm, and the stricken man mysteriously "betrayed in the house of his friends," were alike upheld by an Unseen Hand.

His persistence and noble purpose in inventing — how infinitely more worthy of a place on immortal records than are the deeds of the warrior!

The design of our work allows only a brief sketch of the progress of the art subsequent to the days of Gutenberg.

It is gratifying to note that certain ladies early engaged in the ennobling employment, and for many years won golden opinions.

We gratefully acknowledge obligations to Messrs. Rand, Avery, and Frye, 3 Cornhill, Boston; and also to Messrs. H. O. Houghton and Co., Riverside, Cambridge, for their courtesy in explaining the various processes of their model establishments, to assist the writer in forming a correct idea of the present state of the art.

ANDOVER, *December*, 1870.

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GUTENBERG,

AND

THE ART OF PRINTING.

I.

Strasbourg and its Cathedral. — Gutenberg's Early Life. — Civil Strife. — Romantic Lawsuit.

WHO has not heard of the noble Rhine, which winds many hundred miles through Central Europe? Castles, vineyards, farms, and forests, with now and then a village or a city, diversify its banks.

Prominent among its cities is Strasbourg; a strongly fortified border town, founded ages ago by the Romans, but held recently by France. It was an imperial city of the German empire in 1681, when Louis XIV. got possession of it, by an unwarrantable attack in a time of peace. It is in shape a triangle, with walls six miles in circuit, entered by seven gates. The fortifications extend to the Rhine, although the main city, of 85,000 inhabitants, is situated a mile and a half back on the

Ill, a branch of the Rhine. The tourist, while still far distant, sees the spire of the famous Cathedral, Nôtre Dame. It is the highest spire in the world, a masterpiece of airy open-work, of elaborate tracery and delicate workmanship, towering aloft four hundred and sixty-six feet, twenty-four feet higher than the great Pyramid of Egypt, and more than twice as high as Bunker Hill Monument. The great Minster of which it is a part, was nine hundred years in building, and was finished shortly before our story begins. When the late war came, the Rhine, Strasbourg, and its Cathedral, were not wholly unlike what they were at that time, — four hundred and thirty-five years ago. It is true, railroad trains would shriek on either side of the river, and gaudy steamers bustle up and down, and occasionally a "water-cure" or a "juvenile reformatory" meet the eye, signs of modern progress; but in strange contrast with these the Roman and mediæval remains. Rhineland is at once ancient and modern. Here are "ruins of the Middle Ages, and marks of the French Revolution; the bones of great feudal giants, and scars of modern disturbance." The old homes of the warlike barons still stand, and the incense-flavored churches, whose corner-stones were laid in the dim past.

It is in the year 1436; and the visitor, if he approaches the city from the French side, before

entering the west gate will be sure to seek out John Gutenberg, a noted man who lives in the suburbs in yonder pretty cottage, half hidden in ivy and honeysuckle, and the ancient turrets of St. Argobast Monastery, not a stone's throw distant, frowning upon it. There is a woman of taste within; the well-trained vines speak of her, as do the tulips and wall-flowers. And the eye glances admiringly from these to the apple-trees, with their wealth of blossoms, and the lilacs, jubilant with plumes.

Gutenberg was born at Mentz, a free and rich city on the Rhine, about the year 1400, and, when yet a young man, fled, on account of political dissensions, to Strasbourg, sixty miles distant. Of his childhood little is known; yet some German and other writers draw pleasing pictures of his youth. They represent him as high-spirited, thoughtful, and devout; influenced by a desire that good books might be made common, and as having "a foreseeing consciousness" of the part he was to act in bringing it about. "He said to himself, from his earliest years," says one of his biographers, "God suffers in the great multitudes whom his sacred word cannot reach. Religious truth is captive in a small number of manuscript books, which guard the common treasure, instead of diffusing it. Let us break the seal which holds the holy things; give

wings to the truth, that by means of speech, no longer written at great expense by the hand that wearies itself, but multiplied as the air by an unwearied machine, it may fly to seek every soul born into the world!"

If this was true of Gutenberg while young, no wonder that his manhood was crowned so gloriously. He placed before himself at the outset a great and worthy object; he felt through life the thrill of an inspiring purpose, which stimulated and ennobled his nature, and tended naturally to success. Had he, like thousands, been contented to drift through the world with the current wherever it chanced to bear him, living for himself and the fleeting present, never should we have heard of John Gutenberg.

But there is a fact in Gutenberg's early history which does not seem to present him in an amiable light, as he figures in a lawsuit, having been sued by the father of his betrothed, to compel him to fulfill his promise of marriage. There is, however, no evidence that Gutenberg intended any wrong in this affair, as he sincerely loved Anna von Isernen Thür,[1] the young lady to whom he was engaged. She was of noble family, of the city of Strasbourg. His property had been confiscated in Mentz in the struggle between the plebeians and the nobility, and

[1] Family name, it is said, from the possession of a feudal castle on the heights of the Rhine.

his failure in keeping his troth is attributed to his sensitiveness to his misfortunes.

It has been remarked, that if Mentz, Gutenberg's native place, had not been a free city, he might not have conceived or executed his invention; for despotism, like superstition, imposes silence. "It was fitting that printing and liberty should be born of the same sun and the same air." Mentz, Strasbourg, Worms, and other municipal cities of the Rhine, were small federative republics; as Florence, Genoa, Venice, and the republics of Italy. The youth of our country find freedom favorable to thought and invention; thus young Gutenberg found it. Yet civil strife marked the history of those cities. "In them were the warlike nobility, the aspiring burghers, and the laboring people, who floated between these two contending classes, alternately caressed and oppressed by them, yet at times themselves striving for the supremacy. In these commotions, victory rested sometimes with the patrician, sometimes with the plebeian, and numbers on either side were from time to time outlawed. But these had not the sea to cross to fly the country; they traversed the Rhine. Those banished from Strasbourg, went to Mentz; those from Mentz, to Strasbourg, to await a turn of events, or the recall of the exiles."

In these intestine quarrels, young Gutenberg,

himself of the nobility, "and naturally combating for the cause most holy in the eyes of a son, that of a father," was twice vanquished and expelled by the burghers, with all the chevaliers of the family, — his mother and sisters being permitted to remain in possession of their property. Later, the free city of Frankfort offering to mediate between the nobles and plebeians, it obtained the return of those who had been banished, on condition of the equality of the two classes in the administration of the government. Meanwhile Gutenberg, having become absorbed in his inventive studies, did not return; and his mother petitioned the Republic to give him as a pension a portion of the revenue of his confiscated property. Answer was given, that the refusing to return to his own country, by the young patrician, was a declaration of hostility; and he must therefore be treated as one of its enemies. So his mother continued to send him secret supplies from her own resources.

But the faithful Lady Anna did not seek to free herself from her plighted faith, because of the adversities of her lover. If he shrank from receiving her to the humble circumstances in which he had been thrown, she was still true to her vows. And as his humility and thoughtful scruples could not be overcome in any other way, she vanquished them by a legal summons; her father citing him before a

magistrate of Strasbourg, to cause him to fulfill his promise of marriage. This summons of the Lady Anna to Gutenberg remains to-day as an authentic memorial of his marriage. For the faltering artisan yielded to "this generous violence of affection," and consummated his happiness by marrying the fair plaintiff in the suit.

II.

Gutenberg in Exile. — His Trade as Lapidary. — Curious Law. — Ancient Cuts. — Picture of a Saint. — Legend. — The Bible for the Poor. — A Secret discovered. — Gutenberg's Experiment.

AFTER his banishment, Gutenberg was not an idler. During his exile, we are told that he devoted time to travelling from city to city, studying monuments, and visiting men celebrated in art, science, or handicraft. For not only was he educated, but he cultivated a literary taste, and had chosen a trade, that of the lapidary, or polisher of precious stones. Then, in Germany, the artisan, or one trained to a trade, and the artist, held nearly the same rank; since the trades, scarcely discovered, were confounded with the arts. Indeed, when the humbler professions brought forth their first *chefs-d'œuvre*, they were admired as prodigies, because new. The mechanic arts held an honorable place, only people of property being permitted to learn them; this matter being regulated by the statutes. Thus in England at that period it was decreed concerning persons whose income was less than twenty shillings by the year, "They shall be put to other labors, upon pain of one year's imprisonment."

Hence artisans were a wealthy and influential class in society, and, in some cases, with their daily occupation cultivated a love of knowledge. And Gutenberg, by learning the lapidary's trade, did not descend to the lowest social level, while at the same time he acquired that mechanical skill which was afterwards to turn to the benefit of the whole human race.

He is pictured as occupying the front room of his dwelling as a work-shop, where he plied his trade during the day, and men of standing sought the society of the cultivated artisan, "so high a popularity did he enjoy in Strasbourg for his character and scholarship."

At this time, he seemed scarcely thirty, although six years older; a health-tinted face, high fair forehead, large blue expressive eyes, gave him a youthful look. The precise turn of his chin was hidden in a thick tawny beard. There was an air of grave thoughtfulness about him, as if he was influenced by some earnest purpose.

One evening, just after supper, the serving woman Elsie having cleared the table and swept the hearth, Gutenberg, always busy even in the cozy comfort of his fireside, became absorbed in examining a playing-card. The Lady Anna was seated beside him, and after a little time looked up from her work, and said in her own pleasant way, —

"Prithee, John, what marvel dost thou find in that card? One would think it the face of a saint, so closely thou dost regard it."

"Nay, little wife; but didst thou ever consider in what way this is made?"

"I suppose that it was drawn in outline, and then painted, like other pictures."

"But there is a more excellent way," said Gutenberg. "These lines, I find, were first marked on a wooden block, and then the wood was cut away, so that they were left raised; this portion was then smeared with ink and pressed on the paper. And this, my Anna, is shorter than by drawing and painting, because when once a block is engraved, it can be used to impress any number of cards."

Playing-cards were at this period in common use. Of their origin, there is some doubt. Some have supposed they were invented to amuse Charles VI., King of France, as early as 1393. They are mentioned at nearly the same date in the laws of both England and Spain.

The first cards made were doubtless painted with a stencil; that is, a piece of pasteboard or thin metal plate perforated with holes in the shape of the figures desired. The stencil being placed over paper, the color is applied with a brush, leaving the shape of the figures underneath. As they were so

common and so cheap, it has been thought that the outline must have been made by some rude form of wood-engraving. There is proof that cards were *printed* before the middle of the fifteenth century; for there is a petition extant from the Venetian painters to their magistracy, dated 1441, setting forth that the art and mystery of card-making and of printing figures, which was practiced in Venice, had fallen into decay, because of the large quantity of playing-cards and colored printed figures which were brought into the city. What foreigners brought them to Venice? Evidently the Germans; for they were the chief card-makers of the time. A wood-engraver is still called, in Germany, *Formschneider*, meaning figure-cutter; and this name is found in the town-books of Nuremburg as early as 1441.

As a specimen of the early cards, — which were very rude, — we have here the Knave of Bells.

Perhaps some may think Knave a good name for the article, in view of the characters who sometimes "play cards." But this word had not always the same meaning. Originally, it signified a boy or young man, then a servant, and lastly a rogue.

"An unsightly figure," said Anna, as she examined the one in her husband's hand, "and not to be compared to our St. Christopher," — glancing at the

wall opposite, where hung a picture of the saint, — "which was made with a pen!"

"Nay, it was made from an engraved block, like the card," said Gutenberg.

"Was our picture made in that manner?"

The Knave of Bells.

eagerly asked the wife. "What an excellent art, since it keepeth before us the memory of the saints! The good St. Christopher!" she exclaimed, and with clasped hands for a moment gazed devoutly at

the picture, — a curious wood-cut, representing the legendary saint in the act of carrying the infant Jesus across the sea; beneath, was the date, 1423. The art of engraving had doubtless existed long before, but this is the only positive proof that wood-engraving was used in devotional pictures at that early period. Some years after, the art made an onward and most important step, — an inscription being added to this picture; and the famous block-books, complete with cuts and written explanations, appeared.

The picture Anna so earnestly regarded, was one of the later-date impressions, accompanied with a Latin legend. It was of folio size, and colored, like playing-cards. Beneath was the inscription, or legend: —

Christoforí facíem díe qua cumque tuerís
Illa nempe díe morte mala non moríerís.
Millesímo cccc° xx° terno.

"We almost worshipped that picture in my father's house," said Anna; "but prithee tell me the meaning of the inscription; there was none upon ours."

"It saith," explained Gutenberg, "that one cannot be overtaken by evil, or die, on the day that he looks upon the face of this saint."

"Since that is true, we do well to gaze upon the picture early and late," remarked the wife.

"I revere the saint," returned Gutenberg, smiling, "but am free to confess that I do not see how there can be any power to shield one from harm in simply looking at his picture. The good saint himself had not so easy a path to prosperity."

"Pray tell me of him," said she; "I do not remember to have heard the story since, when a little child, I sat upon my father's knee."

"I will even tell it to thee," answered Gutenberg, "as I heard it in my childhood.

"Offerus, as he was called, was a giant soldier; a heathen, who lived in the land of Canaan. He had a body twelve ells long. He did not like to obey, but to command. He did not care what harm he did to others, but lived a wild life, attacking and plundering all who came in his way. He only wished for one thing: to sell his services to the mightiest. And he first engaged in the service of the Emperor, — having heard in those days that he was the head of Christendom, — yet was not bound by any promise. Thereupon he went with the Emperor through all the land, and the Emperor was delighted with him. All the soldiers in the combat were miserable, helpless creatures compared with Offerus, with his Samson strength, giant chest, and mighty fists. Once, at even-tide, they pitched the tents near a forest, when the Emperor, in the midst of his eating and drinking and the singing of

the minstrel, bade Offerus and his comrades beware of the wicked fiend who was said often to haunt the forest with great rage and fury, adding, 'Let alone the chase in this forest; for in filling thy larder, thou mightest harm thy soul.' Then Offerus said, 'I will enter the service of this lord, who is mightier than you,' and thereupon took his departure, and strode off cheerily into the thickest depths of the forest. There on a coal black horse he saw a pitch-black rider, who rode at him furiously, and sought to bind him with solemn promises. But Offerus said, 'We shall see!' However, one day, as they went together through the kingdoms of the world, along the high road three tall crosses stood before them. The middle cross so appalled Satan that he shrunk away, saying, 'The Son of Mary, the Lord Christ, now exercises great power.' Said Offerus, 'Now will I seek further for the mightiest, whom only I will serve,' and asking every traveller he met where he dwelt. But alas! few have Him in their hearts, and no one could tell, until he was sent by a pious old hermit to a good priest, who showed him plainly the path of faith, and told him he must fast and pray, as John the Baptist did of old in the wilderness. But that advice was not to the giant's liking; wherefore the prior said, 'Give yourself up heartily to achieve some good work. See, there flows a mighty river,

which hinders pilgrims on their way to Rome; it has neither ford nor bridge: carry the faithful over on thy back.' 'Ah, I have strength for that!' said Offerus. 'If I can please the Saviour in that way, willingly will I carry the travellers to and fro.' And thereupon he built a hut of reeds, and dwelt among the water-rats and beavers on the river's brink, carrying pilgrims over the river cheerfully, like a camel or an elephant. But if any one offered him ferry-money, he said, 'I labor for eternal life!' And when now, after many years, Offerus's hair had grown white, one stormy night a plaintive little voice called to him, 'Dear, good, tall Offerus, carry me across.' Offerus was tired and sleepy; but he thought faithfully of Jesus Christ, and with weary arms seizing the pine-trunk which was his staff when the floods swelled high, he waded through the water, but saw no pilgrim there; so he thought, 'I was dreaming,' and went back and lay down to sleep. Again came the little voice, plaintive and touching, 'Offerus, good, dear, great, tall Offerus, carry me across.' Patiently the old giant crossed the river again; but neither man nor mouse was to be seen; and he went back again, and fell asleep, when once more came the little voice, clear, and plaintive, and imploring, "Good, dear, giant Offerus, carry me across." The third time he seized his pine-stem, and went through the cold river.

This time he found a tender, fair little boy, with golden hair. In his left hand was the standard of the Lamb; in his right, the globe. He looked at the giant with eyes full of love and trust, and Offerus lifted him up with two fingers; but when he entered the river, the little child weighed on him like a ton. Heavier and heavier grew the weight, until the water almost reached his chin; great drops of sweat stood on his brow, and he had nearly sunk in the stream with the little one. However, he struggled through, and, tottering to the other side, set the child gently down on the bank, and said, 'My little Lord, prithee, come not this way again, for scarcely have I escaped this time with life.' But the fair child baptized Offerus on the spot, and said to him, 'Know, all thy sins are forgiven; and, although thy limbs tottered, fear not, nor marvel, but rejoice; thou hast carried the Saviour of the world! For a token, plant thy pine-trunk, so long dead and leafless, in the earth; to-morrow it shall shoot out green twigs. And henceforth thou shalt not be called Offerus, but Christopher.' Then Christopher folded his arms, and prayed, and said, 'I feel my end draws nigh. My limbs tremble; my strength fails; and God has forgiven me all my sins.' Thereupon the child vanished in light; and Christopher set his staff in the earth. And so, on the morrow, it shot out green leaves and red blos-

soms, like an almond. And three days afterwards the angels carried Christopher to Paradise."

Anna's eyes swam in tears as Gutenburg finished his graphic and touching rehearsal, and she said, "A most hopeful history. May you, my husband, worthily achieve some good work, like St. Christopher!"

"Aye, dear; and, God helping me I will do something: the world is full of useful labor, which calleth for willing hearts and hands. And the Lord Christ meeteth with his blessing the patient laborers who faint not."

"I can never think," said the wife, "of equaling St. Christopher or thee in good works, since I am neither strong nor wise; but I will even do what I can, and help thee bear thy burdens. But it may be the gentle Christ will freely *give* me eternal life, since I have no means to purchase it."

"Aye, Anna, that would be so like Him: and to me also, for I am no saint, and dare not hope to be."

"But I value the picture the more since your recital," said Anna. "Even if it cannot, as you think, preserve us from evil, it can incite us to persevere in doing well."

"Aye, dear," rejoined Gutenberg, "and devotional pictures like this are much to be prized; they in some sort fill the place of books, which are so rare

and costly. But valuable as this picture is, I found it surpassed in the Cathedral. Dost remember I carried thither the jewels which the Abbot employed me to polish? He took me into the library, and showed me books of engraved pictures, each far more excellent than our 'St. Christopher.' These books were the 'Ars Memorandi,' 'Ars Moriendi,' and 'Biblia Pauperum,' which last consists of forty pictures, with written explanations."

"Truly a marvel, — a book of pictures! And what do they signify?"

"The 'Biblia Pauperum,' or 'Bible for the Poor,' is a history or series of sketches from the Old and New Testaments; it is sometimes so called instead of the name I first mentioned."

"Aye, I remember to have heard of it, but would fain learn more about it."

"Its forty pictures were made by impressing paper with engraved blocks, as in the 'St. Christopher.' The color is brown, the pictures are placed opposite each other, and the blank backs are pasted together into one strong leaf."

"Pray, how large are the pictures?" and her interest growing with her husband's recital, she quite forgot the work on which she was engaged, as he went on to say, —

"They are each ten inches high and seven or eight inches wide, and consist of three pictures

which are separated by lines; and, moreover, there are four half-length figures of prophets, two above and two below the larger pictures. Latin inscriptions are on each side of the upper figures, also verses in rhyme on each side of the lower, and other sentences on labels at the bottom of the whole."

"Wonderful truly! and what more?"

"The middle pictures are from the New Testament, the others from the Old; and the latter in some way allude to or explain the former."

"But what interests me most in this book," added Gutenberg, "is the fact that it is printed from blocks, like the 'St. Christopher.'"

"Dost thou truly think so? Art thou well advised that it is not the handicraft of a skillful scribe?"

"Assuredly I am; it was not made with a pen, but with the engraved blocks, which are to be chosen rather than the slower mode of copying, since being once for all engraved, a number of books can be imprinted as easily as one."

"Aye," returned Anna, "and they will be cheaper than the works written out by the scribes, and still be so dear that whoever maketh them must become enriched by their sale. If thou art taken with this tide, it will lead thee on to fortune. Thou art ingenious; and canst thou not make a 'Biblia Pauperum?'"

"A 'Biblia Pauperum!' Little wife, thou must be dreaming." And Gutenberg saw that she had penetrated his secret.

"But couldst thou not?" she persisted archly; "thou art so wise at devising things difficult to be accomplished."

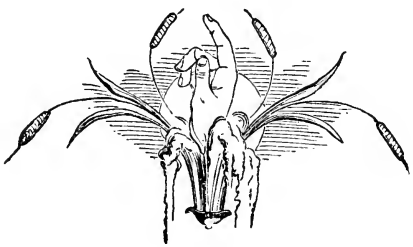
Gutenberg laughed, saying, "I will even bethink me of it when nothing of more service can be done."

But although the suggestion of Anna had been treated as a new and impracticable idea, it was one, as she had divined, that Gutenberg was revolving; and seizing the first leisure hour, he commenced engraving a block, choosing for his subject as simplest and nearest at hand, one of the images of the playing cards.

Anna's estimate of Gutenberg was just. He had a passion for mechanical studies; and history tells us that "he invented many wonderful arts," some of which were connected with his occupation. Not content with following the beaten track, his mind was fertile in expedients for saving labor and perfecting his work. He devised ways to improve the process of polishing stones and mirrors; and these new methods were ranked by the observing among his "arts." These "arts" were stepping-stones to something better and higher — to the crowning discovery of his life. The great art could only be

reached by patiently ascending to it through many lower steps of toil and invention. "It seems," says one, "that every advancement of humanity is purchased with tears, and that suffering is the fatal law of all great beginnings."

But how eventful the path he trod, we shall see as we progress.



ARMED KNIGHT.
(Specimen of early engraving.)

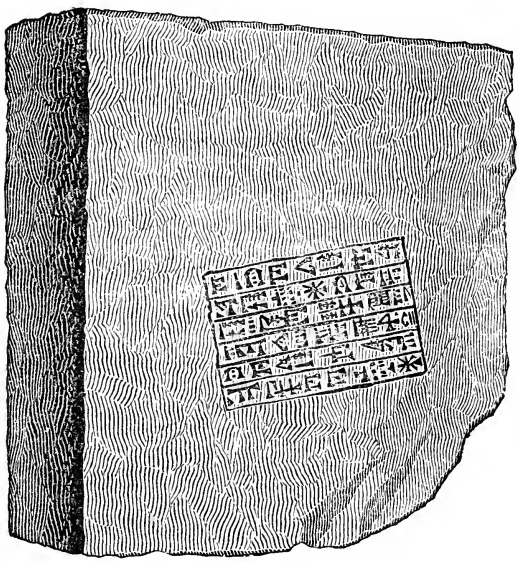
III.

Ancient Books and their Materials. — Sculptures. — Printing in China. — Use of Metals. — Seal. — Stencils. — Waxen Tablets. — Bark, Leaves, Shells. — Papyrus. — Parchments. — Paper. — Palimpsests. — Books written by Hand. — The Scriptorium. — Copyists and their Habits. — Illuminations. — Character of Ancient Books. — Scarcity and Costliness of Books. — Richard de Bury and Library. — Statutes of St. Mary's College. — Books Chained. — Abundance of Books in Modern Times.

LEAVING Gutenberg occupied with his experiment, let us glance briefly at the books of that day, and the modes in which they were made and given to the world.

The most ancient materials used for recording events were bricks, tiles, shells, and tables of stone. The modes of writing on these different substances were various. The tiles and brick were impressed with a stamp when in a soft state; the shells and tablets of stone were etched or graven, the figures or characters being cut in their surface, and in some cases also stained with various colors. It was by the ancient art of stamping that the walls, palaces, and towers of Babylon were covered with hiero-

glyphics, which have but recently been brought to light from under the immense mounds of Mesopotamia by Layard and other explorers.



Babylonian Brick.

The patriarch Job, who is supposed to have lived about 2,300 years after the creation, exclaimed, "O that my words were now written! O that they were printed in a book! that they were graven with an iron pen, and hid in the rock forever!" Stung with the unjust accusation of his friends, he desires to record his words that the generations following might see the justice of his cause. The English translation has given the allusion to printing to the text, the original word signifying rather

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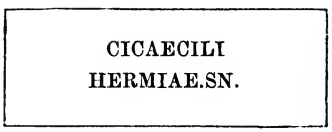
to ingrave on a plate, which was doubtless the only printing known to Job.

Montfauçon purchased at Rome in 1699 an ancient book entirely composed of lead. It was about four inches long and three inches wide; and not only were the two pieces that formed the cover, and the leaves, six in number, of lead, but also the stick inserted through the rings to hold the leaves together, as well as the hinges and nails. It contained figures of Egyptian idols, and unintelligible writing.

China, our ancestor in invention, from remote ages had a kind of stereotyping or printing. It was not, however, as some have supposed, like our printing, phonetic, or the expression of sound, but, like the Egyptian, hieroglyphical; being purely of an artificial structure, denoting every idea by its appropriate sign without any relation to the utterance, and speaking to the eye like the numerical ciphers of the Europeans, which every one understands and utters in his own way. And like most other nations of antiquity, the Chinese were content to remain without alphabetical writing. It is, however, due to the Chinese to add, that they led the way in making good printing-paper. When they invented making it, does not appear, some affirming that they had the use of it from time immemorial; others that they first discovered it in the second century of the Christian era.

Brass, as more durable, was used for inscriptions designed to last the longest, such as treaties, laws, and alliances. Seals, also, were used by the ancients for impressing soft substances. In the British Museum there is a stamp of metal with raised letters. On the back of it is a ring, enabling the owner to wear it as a signet; his name, Caius Julius Cæcilius Hermias, being engraved in reversed letters upon it.



Expanded according to the modern practice, the signet reads: —

C. I. CÆCILII HERMIÆ SIGNUM.
Caii Julii Cæcilii Hermiæ Signum.

This seal of Hermias was intended for stamping parchment with ink, as is shown by the fact that the roughness of the surface below the letters unfits it for stamping any soft substance into which it would sink, as into wax. If rubbed with printers' ink and pressed upon paper, it prints very well. Thus the seed of this noble art was among the Romans. With a block of wood covered with raised letters, they might have printed a page, as well as a single name. But they were suffered to grope their way from age to age blindfolded to the art of which they had the clew. They almost grasped the great discovery, unconscious of the prize.

Quintilian, speaking of the education of youth, says, "When the boy has begun to trace the forms of the letters, it will be useful for him to have the letters of the tablet engraved, that through them, as through furrows, he may draw his style. For thus he will neither make mistakes, being prevented by the edges on both sides, nor will he be able to go beyond the proper bound; and by tracing quickly and frequently certain forms, he will strengthen his joints, and will not need the assistance of some one to put his hand above his own, and guide it." Here we find that the old Romans knew something of the art of stenciling.

The Emperor Justin, who lived in the sixth century, could not write, and, to avoid the shame of making only a mark for his name, caused holes to be bored through a tablet in the shape of the first four letters of his name. Through these holes he traced the letters in red ink. Theodoric, King of the Ostrogoths, it is said, wrote his name through a gold plate, in the same manner.

Tablets, or little tables of wood, as well as of metal, came at length to take the place of stone tables. The thin wooden tables were sometimes covered with wax, which was written upon with a style, or ivory pencil. These were so much like tracing in the sand, as soon to be laid aside, and the smooth, inner bark of trees, called *liber* in the

Latin, was used instead; also the leaves of the palm-tree, cloths of cotton and linen, the intestines and skins of animals, and the backs of tortoises. We derive our name *book* from the Danish *bog*, the beech-tree, since that was used to engrave on in Denmark, because of its abundance.

The Egyptians very early employed a broad-leafed rush growing on the banks of the Nile, as a material upon which to write. This was the *papyrus*, a word which has given its name to our modern paper. Large bundles of papyrus manuscripts, covered with hieroglyphics, have been found in the ancient tombs and temples of that country, some of which are capable of being deciphered at the present day.

Parchment, which is the prepared skins of animals, came into use B. C. 250. It was so called from Pergamus (*membrana pergamea*), whose king, Eumenes, seeking to collect a library which should vie with that of Alexandria, and being debarred a supply of papyrus by the jealousy of the Ptolemies, had recourse to this substitute. After the eighth century, parchment generally took the place of papyrus.

Ancient books were not commonly disposed in a square form, as with us, but were *rolled* up. Hence the word *volume*, signifying a roll.

Paper from cotton and linen rags began, it is

thought, to be made as early as the ninth century. For several centuries, however, the manufacture was so scanty as to increase very little the facilities for copying. Gradually, it became more plentiful, and writing material of small cost laid the foundation for that cheap and expeditious mode of copying which we call printing.

In the age when parchment was used, it was often difficult to be obtained; and it became common to erase the original writing from a manuscript and trace another upon it. A parchment thus used was called *palimpsest*, which means "twice prepared for writing." Thus, many valuable works were destroyed to make way for newer, and, in some cases, less important ones. Happily we live in a time when we have no occasion to destroy one library to produce another.

It seems strange, too, that a transcriber familiar with the labor of copying would not be deterred by his love of learning from putting even one book out of existence. But necessity knew no law; and the writer, deeming his own work to possess greater utility, sacrificed another to make room for it, — to such straits were the scribes sometimes brought for the lack of writing material. Struggling to express thought, there was no room to put it down. Written language, scarcely second to spoken language, had almost perished; and had the art of printing been

invented before paper was known, it would have been comparatively useless.

The writing and rewriting on parchment, as it was often done two or three times, has recently led learned men to make these ancient parchments a study; and they have thus deciphered or read the last writing, then, effacing that, have deciphered the second, and, effacing that, have read the first, — often the most valuable, — and in this way have brought to light lost works, and found out many important facts of history.

The books of those early days were written out by hand, *manuscripta;* and the profession of the copyist was one of the most numerous, honorable, and lucrative. Some booksellers employed great numbers of copyists, paying them salaries, and made their own livelihood on the profits of selling the works thus copied. There were in Rome, and in some of the great cities of Greece and of Asia, particular places where such works were sold. The rich also sometimes had slaves, prized more highly and treated more familiarly than other slaves, who were devoted by them to copying the works of antiquity and of their time, for their libraries. Government, too, employed a great many copyists for its edicts, and orators employed them in transcribing their discourses. Later, the eunuchs copied at Byzantium the chief works of Greek, Latin, and

Hebrew antiquity. Finally, there were the monks, who, in the retirement of the monasteries, gave their time very much to the multiplication of books by the slow process of writing.

In every great religious house, or abbey, there was an apartment called the scriptorium, or writing-room, where boys and young men were employed from morning till night in copying the singing-books of the choir, and the less valuable books of the library. Only a few of the monks copied in this large apartment, enough to give directions, and keep order among the boys and novices. Most of the "Holy Fathers," as they chose to be styled, spent their time in the cells, transcribing Bibles and other valuable works.

A monk copying. He has a cowl on his head, and wears the priest's long gown with flowing sleeves. His waist is girt with a belt; and he sits bolt upright, or slightly leans forward in the most perpendicular of arm-chairs, which seems to be joined to the desk of his cell. How curiously he holds his quill and pointed ferule! His prior is cautious and methodical; for he has chained the manuscript from which the monk is copying to

the wall, as if experience had taught him that he cannot overmuch trust the brothers.

An author of those times would make a similar appearance, save that there would be no book before him, unless for reference.

Richard de Bury, Bishop of Durham, in his "Philobiblion," a treatise on the love of books, written by him in Latin in 1344, gives a good picture of the transcriber, or copyist of the monastery. He says: "As it is necessary for a State to provide military arms, and prepare plentiful stores of provisions for soldiers who are about to fight, so it is evidently worth the labor of the Church to fortify itself against the attacks of pagans and heretics with a multitude of sound books. But, because everything that is of use to mortals decays through lapse of time, it is necessary for volumes corroded by age to be restored by new successors, that books may not cease to exist. Hence it is that Ecclesiastes truly says, in the 12th chapter, 'There is no end of making many books.' For, as the bodies of books decay, so a remedy is found out by the prudence of clerks, by which a holy book paying the debt of nature [*i. e.*, dying] may have one succeed it, and a seed may be raised up like to the most holy deceased, and that saying of Ecclesiastes, chapter thirtieth, be verified: 'The father is dead, and as it were not dead, for he hath left behind him a son like unto himself.'"

Then he goes on to upbraid the priests for soiling books, giving us rather an unfavorable impression concerning the habits of the monks. One would suppose that they could command the leisure to keep clean. The Bishop just quoted deplores "the unwashed hands, the dirty nails, the greasy elbows leaning upou the volume, the munching of fruit and cheese over the open leaves, which were the marks of careless and idle readers," and suggestive also, some would say, of lack of culture and refinement, and even that their religion was of a low type ; else would it not, at least, have produced the virtue which is next to godliness ?

Then follow sound and sensible directions how to use books. "Let there be a mature decorum in opening and closing of volumes, that they may neither be unclasped with precipitous haste, nor thrown aside after use without being duly closed."

Says an English writer : "When a volume was at last produced in fair parchment, or vellum, after the arduous labor of years, it was covered with immensely thick lids of wood and leather, studded with large nails, and curiously clasped, and was studiously preserved from the common gaze on the shelves of the monastic library.

"The splendid volumes thus made, bore evidence, however, not only of persevering industry, but of great ingenuity ; the letters at the beginning of

each chapter or section being adorned with curious devices. Frequently, too, a painting called an illumination was introduced radiant with gold, crimson, and azure. But no vulgar or unpriestly eyes looked on their contents, unless, indeed, we except kings and princes; they were only unclasped on days of solemnity, by the abbot or the prior, and then restored, like the jewels of the priesthood, to their dusty cases."

Montgomery says, "The readers of those days were rather gluttons than epicures in their taste for literature," canonizing all books because they were books, as children eulogize their toys without noticing the quality. "To say all that could be said on any theme, whether in verse or prose, was the fashion of the times; and as few read but those who were devoted to reading by an irresistible passion or professional necessity, and few wrote but those who were equally impelled by an inveterate instinct, great books were the natural produce of the latter, who knew not how to make little ones; and great books only could appease the voracity of the former. Great books, therefore, were both the fruits and the proofs of the ignorance of the age. They were mostly composed in the gloom and torpor of the cloister, and it almost required a human life to read the works of an author of this description, because it was nearly as easy to compound as to digest such

crudities." These labors of the learned could not of course interest the common people, as they could neither understand nor buy them. These were books without meaning, — with so little logic and connection that the more one read, the deeper he got into the maze or tangled mass of words. "And the lucubrations through a thousand years, of many a noble, many a lovely mind, which only wanted better direction how to unfold its energies or display its graces to benefit or delight mankind, were but passing meteors, that made visible the darkness out of which they rose, and into which they sank again to be hid forever."

Nevertheless, we owe it to the monks to say that there were many good and learned men among them, and for much that is valuable in our libraries we can not thank them enough. We can never consult a concordance of the Bible without calling to mind that they first conceived the idea of such a work, and numbers of them, jointly laboring long and incessantly, nobly laid its foundations, on which others who came after raised the structure and reaped the glory.

It will be readily inferred from what has been said that books in those times were scarce and costly. Only the rich could afford to have them, and they had but very few. The monasteries and universities had libraries, and occasionally one was

found in the castles of the nobility. The Cathedral of Nôtre Dame, in Strasbourg, was famed for its splendid collection of five hundred volumes. The Countess of Anjou bought a book of Homilies, paying for it two hundred sheep, five quarters of wheat, and the same quantity of rye and millet. Henry V., King of England, borrowed a book from the Countess of Westmoreland; and not having returned it at his death, the Countess petitioned the Privy Council that it might be restored to her by an order under the privy seal, which was done with all formality.

Richard de Bury, whom we have already mentioned, had gathered in his life-time, by copying with his own hand and by purchase, a valuable library. In his will he bestowed a portion of it upon "a company of scholars residing in a hall at Oxford," and one of his chapters is headed "A Provident Arrangement by which Books may be lent to Strangers," meaning, by strangers, students of Oxford not belonging to that hall.

This library, from which a book could not be borrowed without giving ample security, was finally given to Durham, now Trinity College, and contained more books than all the bishops of England had then in their possession. For many years after they were received they were kept in chests, under the custody of several scholars chosen for that pur-

pose. It was not till the reign of Henry IV. that a library was built in that college; and then the books were taken out of the old sepulchral chests, and "were put into pews or studies and chained to them." In 1300, the library of Oxford consisted of a few tracts kept in a chest.

Chained Bible.

The statutes of St. Mary's College, Oxford, in the reign of Henry VI., furnish striking proof of the obstacles to study caused by a scarcity of books. "Let no scholar occupy a book in the library above one hour, or two hours at most, so that others shall be hindered from the use of the same." This reveals quite a famine of books, but not so great as at a still earlier period of the Church, when one book was given out by the librarian to each of a religious fraternity at the beginning of Lent, to be read diligently during the year, and to be returned the following Lent.

The old way of shutting up books in chests shows that they could not be often changed, for whenever one was wanted the whole pile must be disturbed.

The next plan was to allow the books the privilege of light and air, but to chain them to desks and in cages, as if their keepers looked upon them literally as riches with wings ready to fly away.

The following passage, malediction of some grim friar perhaps, was often written on the first leaf of a book: "Cursed be he who shall steal or tear out the leaves, or in any way injure this book."

A milder and more modern couplet, is —

"Steal not this book for fear of shame,
For here you see the owner's name."

Thus various were the devices from time to time to secure the possession of treasures more precious than gold.

How different the state of things at this day! Instead of being rare and expensive luxuries, books are abundant both in the homes of the rich and the poor.

IV.

An Important Step. — Engraving a Name. — Engraving Pictures. — Superstitions. — Difficulties overcome. — An Improvement. — Experiment and Progress. — A New Book. — Cheerful Thoughts.

ONE day, a few weeks after the events in our second chapter, Gutenberg surprised his wife as she sat sewing by the window, saying, —

"Behold some of my handicraft!" showing her a number of cards.

"Ah, and so you did not give up the project? and you have succeeded so well! One could not distinguish between these and the old ones, save that these are newer and fresher."

"Nevertheless, this is but a step; it availeth me little till I can frame letters, and impress them on vellum in like manner. It remains that I try thy name, my Anna. I cannot fail to engrave that name on wood, which hath been so long traced on my heart!" And to his loving glance there beamed a happy light in her eyes, and her cheeks were aglow, as he betook him to writing her name on a

small wooden tablet. Cutting away the wood, except the writing lines, he left the letters raised, or in relief, and thus formed a stamp of his wife's name. Moistening it with ink, he placed a piece of paper over it, and, gently pressing it upon the letters, beheld, on lifting it, the word imprinted upon the paper.

We of this age of books and papers cannot enter into his emotions. But Anna could, and so the good man did not miss our sympathy.

"Famously done!" she exclaimed; "it is the likeness of writing."

Does this seem to us a curious commendation of printing, that it resembled writing? But the manuscript letter was the only one known as yet, and it was natural to judge the result of the new experiment by its agreement with that letter.

"Aye, I think myself it is not a failure," said Gutenberg; "and I fancy it would not be difficult for me to produce a copy of that picture of 'St. Christopher,' I mean by suitable patience and perseverance."

"But was not that done with a pen?"

"Nay: it appears so, but on examination I find that it was made with an engraved block;" and taking the rude print from the wall, he showed upon

the back of it the marks of the stylus, or burnisher by which it was rubbed upon the letters. "Rest assured from this that they were never produced by a pen, as in common writing."

"Well," returned the good wife, "it would truly be a pious act to multiply the picture of 'St. Christopher,' since a blessing will follow him who looketh upon it. I would fain have one in our sleeping-room, that my eyes may light upon it when I awake."

Poor Anna! she had already forgotten Gutenberg's sensible remark on a former occasion. Educated to attach a superstitious value to sacred pictures, she still relied on them. This perverted trust, however, shows that she felt her need of the protection and favor of a higher than human power.

Encouraged by the approbation of his wife, and nerved by that passion which urges the inventor onward in the pathway of discovery, Gutenberg undertook the task with alacrity. First he met the difficulty of finding wood suitable for engraving. Some kinds were too soft and porous, others liable to split. After many trials, he selected the wood of the apple-tree. This has a fine grain, is dense and compact, and sufficiently firm to bear the process of engraving. In modern times box-wood is almost exclusively used in this art, as superior to all other species in the qualities required. It is sawed in

blocks crosswise of the grain, and these polished and whitened, present a surface almost as smooth as ivory, and capable of receiving the finest touches of the pencil and the graving tool.

Another difficulty in his course was the want of tools; his unfailing genius came to the rescue, and tool after tool was contrived, until his tool-box showed an array of knives, saws, chisels, and gravers of various patterns, each one in its turn having been duly admired by the pair of bright eyes that followed his progress.

At first Gutenberg drew the portrait of the saint and the inscriptions accompanying it on the same block; but in later experiments he hit upon the idea of having them on separate pieces, the different blocks being nicely fitted together in printing. This was an onward step, which he viewed with satisfaction.

"These movable blocks will be of service," said he to Anna; "for I can complete the picture as well as the letters better in this way, and, when desirable, can embellish the writing with ink of another color.

At length, when the "St. Christopher" appeared, printed from the improved block, Anna exclaimed that it was far better than the old one.

"Yes," replied Gutenberg, "but I perceive that it is not perfect. No picture can be properly ex-

ecuted without thicker ink. This flows too readily, and with all my care I can scarcely avoid blotting."

It required many experiments and much patience to surmount this difficulty of the ink. He found finally that a preparation of oil would best serve his purpose. The color might be varied according to the ingredients used. In the earliest works which have come down to us, it is of a darkish brown, and appears to have been made of umber. This was chosen probably in imitation of the old drawings which served as copies. A mixture of lampblack with oil gives a black ink ; and this is substantially the composition of printer's ink at the present day.

As Gutenberg experimented, Anna watched his progress with excited interest. When he had succeeded in preparing an ink of suitable quality, she saw that he needed some means of spreading it evenly upon the block.

" Now indeed thou canst aid me," said he ; " stuff and sew this piece of sheep-skin, while I prepare the paper for the impressions." The nimbly flying fingers soon completed the task ; and when Gutenberg had added a handle to the ball, the first printer's dabber was ready. " One more servant of my art," Gutenberg pleasantly said as he dipped it in the ink which he had ground upon a slab, and ap-

plied it to a block. He then laid the paper upon it, and, with the polished handle of one of his graving tools, carefully smoothed and pressed it upon the raised portions of the block, — both picture and its letters. He then cautiously removed it, and both viewed the result with joyful emotions.

"The new ink works marvelously!" said the inventor.

"And this print even surpasses your first attempt!"

"Yes, and I value it the more for the labor and contrivance it has cost me."

"Now I shall want a 'St. Christopher' in every room," said Anna; "it will be like having more good people in the house, and our lives will be inspired by the memory of what they have done."

"But what am I to do?" rejoined Gutenberg. "I cannot afford the time and money to occupy myself in making pictures, unless it can also be turned to some pecuniary advantage."

"And is there no way of acquiring money from them?"

"Not at present. I have, however, made an improvement on the pictures; they will grace our humble home, and it may be that I can make them useful to others."

"Yes, for whoever seeth them will want one."

"And be willing to pay for it?"

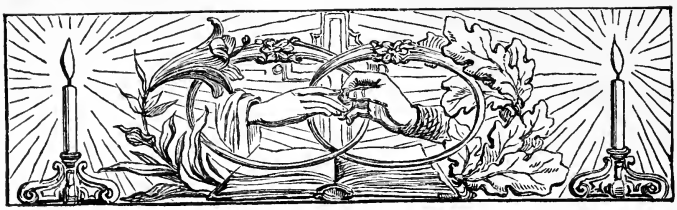
"Aye, why not?"

"We shall see. Thou hast confidence in my experiments."

"Ah, indeed have I; since I perceive that thou hast the power of devising wonderful arts!"

Thus cheerily did the lapidary's wife encourage him, admiring his work, suggesting the bright side of affairs, then tripping out into the yard to console the pigeons with seeds, to water her flowers, and train the wild-growing climbers within bounds, her heart the mean while full of her husband's enterprise; and she murmured to herself, —

"John will succeed, and we shall be delivered from our trouble."



V.

Pecuniary Troubles. — An Expedient.. — Disappointment. — The Jewels. — A Sale. — Apprentices. — Visit to the Cathedral. — A New Enterprise

GUTENBERG'S gratifying success was not devoid of trial, as has been hinted. In his hasty flight from Mentz, he had little money with him, and years of embarrassment followed, despite his diligence in business and economy. His mother's remittances had been carefully husbanded; but since engaging in block-printing, this store had wasted away.

How could he retrieve his losses, and gain means to bring out other discoveries? He revolved the matter while Anna slept, and, rising with early dawn, took impressions of the "St. Christopher." At breakfast he told his wife of his purpose to sell them to his neighbors. She warmly approved, and offered to arrange them in the shop, greatly to the relief of Gutenberg, who answered with emotion,

"So thoughtful of thee, my Anna; and our necessity urgeth speedy sales."

"Aye, they shall beautify the shop," said the little lady as she arranged the cuts, placing one here, another there, and viewing the effect of the light, and hied her to the adjoining room, just when Mrs. Anna Schultheiss stepped into the shop on her way home from market. Her dowry jewels were being reset, and she was anxious to get them.

"My jewels not done yet!" she exclaimed, "Ah, indeed, master, and how can I go to the marriage-feast, wanting them?"

"Be content, mistress," replied Gutenberg; "thou shall have them at sunset."

"Thanks, good master; but what pictures are these?" glancing around the room as she spoke. As he passed one for her inspection, she cried: "Mirabile! the good saint! See him bearing the infant Jesus over the water. How could the child have forded the stream without him? Wrap the picture nicely, and I will take it home with me. My husband is a formschneider, and thou mayst need his aid." Gutenberg crimsoned, but gave her the cut on her own terms, and she bore it away with delight.

When next a neighbor called, and after admiring the prints, purchased one, the inventor breathed more freely; and the lively sound of his graving tools soon indicated how greatly encouragement lightened his toil.

Others, however, calling to purchase gems, chose the pictures. At the evening meal Anna was radiant, and congratulated her husband that the pictures found a ready sale.

"Nevertheless, I have lost money to-day," replied he, a little depressed.

"Ah! and how did it happen?"

"Those who purchased prints had purposed to buy gems, and a fair estimation makes me the loser. The pictures draw attention from my jewels and mirrors, and do not return an equivalent. I fear the two pursuits will so conflict as to prevent success with either!"

Anna was illy prepared for this intelligence, and urged, "But thou wilt do better when used to both labors. Moreover, I can aid thee. Did I not arrange the cuts? And when the wood-carrier admired my print, did I not sell him one, and allow him to bring wood in payment?"

"Thou hast well earned a benediction," returned the husband, smiling.

"When dost thou go to Nôtre Dame Cathedral?" asked Anna.

"When I shall have finished the Father's jewels. I must confess to thee, dear, as before, that in engraving blocks I have lost ground in my trade."

"Nevertheless," replied Anna, bent on dispelling his despondency, "it is a favorable omen that thy

handicraft of pictures is of the saint that shieldeth from evil."

By dint of close application, Gutenberg, having completed the Superior's jewels by noon of the next day, returned to his engraved blocks, and before evening of the second day had given the finishing touch to several prints. Laden with jewels and pictures, he left the house, Anna wishing him God-speed, and watching him till the mass of vines, shrubbery, and apple-trees hid him from sight. The cloistered Cathedral was not far distant, yet the winding way which led there was quickly lost in the luxuriant foliage.

On his arrival he was ushered into the library, which might be termed a scriptorium, or monks' writing-room, so many copyists there plied the pen. Having delivered the jewels, he showed his pictures.

"Whose handicraft may this be?" quoth a gray-headed friar.

"The name of the artisan doth not appear," was the reply.

"Where didst thou obtain them?" asked another.

"Suffer me to keep a little secret," replied Gutenberg, "which would not benefit thee if told."

"I will purchase the entire lot," said the Abbot, after examining them. "They will grace the walls of the library, and tend to preserve us from evil."

Anna came running to meet Gutenberg as he returned, and was well pleased to learn of the sale.

"And now," said she, "thou art in a fair way to get rich!" But Gutenberg said, gravely, —

"We must not forget that the steady gains of a regular business are more to be relied on than occasional successes in other pursuits." Yet Gutenberg was himself loath to take this view, and turned reluctantly to his trade.

Not long after, he was surprised one morning by the entrance of Andrew Dritzhn, an intelligent citizen of Strasbourg, stout and hale-looking, and about thirty-five years of age. Taking a seat, he wound through a long talk, and at last made known his errand, which was to ask that Gutenberg would allow him to come and learn his trade. The latter loved the quiet of his own thoughts too well to choose the presence of a workman in his shop.

But when he considered that if he once had a good artisan in his employ, the jewel and mirror business could go on, and himself have more time for his printing researches, he decided to engage Dritzhn. But no sooner was Dritzhn in favor with his new employer than he introduced his friends Hielman, whose brother was the first paper-maker in Strasbourg, and Riffe, who craved a like favor of being admitted to learn Gutenberg's trade. The shop now presented a busy scene with three ap-

prentices, — Dritzhn, careful, plodding, ingenious, and eager to learn; Riffe, mostly engaged on mirrors, complacently catching glimpses of his own round visage as his work waxed bright; and Hielman, polishing jewels and making himself generally useful. But what with the din of the wheel, saw, chisel, and polisher, the inventor had little time for thought. It was, "How shall I do this, Master Gutenberg?" "What next, master?" from morning till night; and he could not command time to pursue his engraved blocks, as he had hoped. Yet it was necessary, for the purpose of disguising from his associates for a longer time the real object of his secret enterprise, to devote himself with them to many curious and secondary industries. There was "the cutting and fashioning of precious stones; the polishing of Venetian glass to make mirrors; cutting the mirrors into facettes or diamonds; the encasing them in copper frames, which he enriched with figures of wood representing personages of fable and of the Bible." These mirrors were sold at the fair of Aix-la-Chapelle, and helped the funds of the association, as well as Gutenberg in the secret expenses destined to accomplish and perfect his invention. To secure the needed seclusion, he fitted up a room, and spent his evenings on the hidden art in the presence of Anna, after the workmen had left the front shop.

For the purpose of selling "St. Christophers," he again visited Nôtre Dame; and on his return, Anna's glance at his face assured her that he brought good news.

"Ah," said he, "but it is not because I have returned with much money, although I may have done as well." And undoing a wrapper he produced the "Historia Sancti Johannis Evangelistæ," or "History of St. John the Evangelist," which he had obtained in exchange for cuts. "What think you of this?" said he. "See, it is written on vellum with illuminated initials,[1] and has sixty-three pages. And observe, it is copied with a pen: some patient monk has toiled over this many a weary day in his cell. But I have a plan which I think will be an improvement, which is to engrave it as I did the picture."

"Engrave a book! It would be delightful to have one made by thine own skill!"

"Yes, and when once the blocks are engraved for the book, — a block for a page, sixty-three blocks, I can impress a score of books as well as one copy."

"And thou canst sell books as well as the

[1] *Vellum.* A finer kind of parchment or skin, rendered clear and white for writing. *Illuminated initials.* Capital letters, commencing a chapter or paragraph were said to be illuminated when made large and painted in colors; often being ornamented with delicate devices of flowers, birds or animals. The monks were skilled in this adornment of books.

monks!" cried Anna joyfully. "Neither wilt thou be shut up in a cloister a year to copy one small book; but I wouldn't wonder when the blocks are prepared, if thou couldst make a book in a day, even saving time and earning money!"

"A likely matter truly! but we must not build air-castles!" Sage advice for him to give who was himself a castle-builder, as are all enthusiastic people, — may they never be less; for what would be done in this work-a-day world without the healthful stimulus of the illusions of hope?

A small table in the sitting-room was at evening a work-bench. It was neatly covered in the day-time, and Anna's work-box was on it. But the inventor found it necessary to seek entire seclusion for some of his processes, and secured, it is said, a fitting place in the ruins of the St. Arbogast Monastery, abandoned to the moles and the bats save the part which was inhabited by the poor people of the suburbs of Strasbourg; and there, in a forsaken cloister, he established his secret study and work-shop, whither he withdrew whenever his presence could be spared from the front shop. Not even to Anna did he divulge his hidden work. She was content, knowing that in good time she would know the result.

Evening came, and in the quiet home-room the inventor commenced engraving the first page of the

"History of St. John," carefully tracing the letters on the smooth surface of the block, and imitating the most approved copyist's hand. As Anna watched him, she thought them perfect, and with good reason.

Toil on, busy worker! Glorious things will follow thy labor!

VI.

Unwelcome Visitors. — Unjust Demand. — A Compromise. — Secret Firm. — A Removal. — Teaching the Workmen. — Block Printing. — Success.

DAY after day Gutenberg busied himself with his associates in various labors, except at intervals, when he engraved blocks, enlivened by the sprightly presence of Anna, or pursued his experiments in the recesses of the monastery.

"How famously you get on!" said Anna, one evening, as she counted his pile of finished blocks while he wrought at his engraving.

There was a knock; and, in an instant, to the consternation of both, Dritzhn and Hielman opened the door, and, without ceremony, entered. Gutenberg was surprised with block and graving tools in hand, and the "Historia" open before him.

"Ah! what have we here?" asked Dritzhn, stepping up to him; "something new in mystery?"

"Excuse me," replied the inventor, coloring, "if I waive an explanation for the present."

"But," said Hielman, drawing nearer and speaking in excited tones, — for he was a close man in money matters, — "thou didst engage to teach us thy arts, if we would pay thee."

"It is true," answered Gutenberg, "that I did covenant to show thee my arts of the lapidary and mirror business, but that agreement did not cover other arts which are only partly known to myself."

"Be persuaded to do the fair thing, good master," said Dritzhn.

"In paying thee," added Hielman, "we understood that thou wouldst teach us all thy arts. We want our money's worth."

"I have found it necessary," observed Gutenberg, not appearing to notice the remark, "to be favored with quiet and seclusion in pursuing any new branch of business, and I cannot succeed in this unless it be kept a profound secret. Still money is needed to carry it on."

This only made Dritzhn more eager to learn the nature of the enterprise; and he answered, "If that be all, we can keep thy secret, furnish funds, and perhaps help thee in the work."

Gutenberg, with many misgivings, finally decided to trust them, first obtaining from each a formal pledge of secrecy. Then producing his cards and cuts, he explained, step by step, the process of making them. His callers expressed great interest and admiration.

"I can be of service in executing the figures," said Dritzhn, "as I am a draughtsman."

"You could assist me in that direction," said the inventor; "but I am now mostly engaged in engraving tablets for books."

"Making books by engraving!" exclaimed Dritzhn. "When will the marvels cease?"

"I have invented a way of imprinting books by a process unknown to any others. Only block picture-books with inscriptions have approached the idea." Gutenberg then showed the "Historia" on which he was working.

"Master," cried Dritzhn in amazement, "a man of such genius will surely realize a fortune! Why, it would take the wages of a common artisan two years to buy such a work; and you have a large part of it done in a few weeks." But Hielman, afraid of new projects, was less sanguine.

"This will succeed," urged Dritzhn aside to him, "and we shall want a share in it. Since also we know the secret, and have bound ourselves by an oath, we cannot honorably turn back. It only remains to aid Master Gutenberg to the extent of our power." Then turning to Gutenberg, he said, —

"But will not this art do away with copying?"

"Not at once," replied Gutenberg. "But if the copyists should get a hint of what this inven-

tion can do, they might seek to crush it. Moreover, the art is only begun; I learn something new day by day; and I have confided my secret to you, that as a firm we may bring it to perfection."

The sequel of the interview was that a written contract was drawn up by Gutenberg, who was a ready writer, and signed by them all, binding the parties for the term of five years on two conditions: —

First, that they pay Gutenberg the sum of two hundred and fifty florins; one hundred immediately, and the remainder at a certain fixed period. Second, that if any one of the partners should die during the time of the copartnership, the survivors should pay to his heirs the sum of one hundred florins, in consideration of which the effects should become the property of the surviving partners.

Other items followed; and, above all, the profoundest secrecy was enjoined.

Business, however, went on as usual through the day; and a customer chancing in Gutenberg's workshop would not have dreamed of the existence of the secret firm to prosecute the new art. Dritzhn wrought as if in deep thought; but if at times he seemed to loiter, he made out his quota of work ere the day's decline. Hielman polished as usual on

mirrors; and Riffe, although burdened with the secret, kept at work with his old cheerful whistle.

When evening came, a second conference was held at the home-room of Gutenberg's house, when Riffe also took the oath of secrecy, and signed the contract. But Gutenberg was oppressed with foreboding. Since his hidden occupation of the engraved blocks had been discovered by Dritzhn and Hielman, he saw that others also might find it out. On mentioning his anxiety to the firm, Dritzhn at once replied that the business ought to be removed to a more retired place, and made offer of his own upper room. After examination, Gutenberg decided to make the change, and a part of the engraving apparatus was forthwith carried to that place. In order, however, to cover appearances, and also meet expenses, it was judged best for Hielman and Riffe to continue the lapidary and mirror department, as usual, in the front shop, while Gutenberg and Dritzhn were to spend a portion of their time in engraving blocks in the upper room of the latter, although some of the work was still done, as before, at the inventor's cottage. This arrangement seemed necessary to make the twofold occupations thrive. Hielman and Riffe still needed much instruction in gem and mirror polishing, and they had also the advantage of regular lessons in engraving, to which they were entitled by the articles of agreement.

Gutenberg's "Historia" was necessarily somewhat hindered, as his attention was much occupied with teaching Dritzhn in engraving blocks. As, however, the latter had skill in drafting, he very readily caught the ideas indispensable to the art, — accuracy in drawing the figure, and a careful management of the graver's tool in cutting away the block so as to leave the lines raised. Dritzhn made good progress in figure-cutting on card-engraving, which was the first lesson Gutenberg gave him; but in attempting to engrave letters, he was not so skillful.

"That department of the art can only be acquired by patience and labor," said Gutenberg to his pupil. "I therefore advise that you continue on the figures."

Thus pleasantly they wrought together, Dritzhn on figures, and Gutenberg on letters, for he still pursued the "History of St. John." Hielman and Riffe were quite awkward as pupils in the art. In the first place, neither had any idea of drawing, and Gutenberg was under the necessity of teaching them the elements of that science; then they could not read, and he must needs initiate them into the mysteries of the alphabet. Anna came to the rescue, or poor Gutenberg would have despaired of making them engravers. She taught one his letters, while her husband instructed the other in drawing

straight and curved lines. Anna, after a time, hit upon a short route to accomplish both together, and required her pupil to draw a letter as soon as he had learned it. In this way, what with the efforts of Gutenberg, and the suggestions of Anna, they soon made perceptible progress, and in due time were familiar with the alphabet, and could draw it passably well. While occupying most of their time with the lapidary and mirror business, they still gave several hours each day and evening to the new art.

When Gutenberg advanced Riffe and Hielman to engraving the letters which he had drawn, they sadly blundered.

"What a world of patience you had, master, when you worked through all this alone!" said Hielman, showing his block, on which, after much painstaking, he had cut a Y in the shape of a well-sweep.

"It is a wonder to me, master, how thou didst discover this art, when it is such a labor for us to learn it!" exclaimed Riffe; and he held up a B which looked more like a camel.

"There's nothing like trying," said Gutenberg pleasantly, as he went through the process of drawing another letter for each. It was, however, a source of great annoyance to him to have so many blocks ruined by his workmen; and he bethought

him of a way to prevent this waste, which was to give them small strips of wood of little value, on which to make their experiments in cutting letters, which may have led to the idea of movable type. Meanwhile, as he had time, he progressed with his book. By dint of patient plodding, Dritzhn finished the figures of the work, when Gutenberg had accomplished the more toilsome labor of graving letters, page by page.

The blocks of the "Historia" were completed, and great was the joy of all parties, — none being more enthusiastic than Anna, who thought doing the work so quickly, scarcely less than a miracle.

"Now is my time to help," said she; "I can take the impressions!" Her husband smiled, and Dritzhn looked incredulous, which made her more eager to be of use in expediting the issue of the famous "History." Gutenberg gladly accepted her proffer of aid, saying, —

"We welcome thy assistance, my dear, and we shall all be very busy. To-night we must fold and cut the paper into the right size for pages, and also grind the umber and make the ink, and to-morrow we will commence impressing the leaves."

Thus they wrought as busy as bees, and it proved to be rare honey that they stored in those days of patient toil, — honey for the world, which will never be exhausted for all time, as our sequel will show.

Gutenberg and Dritzhn impressed the pages from the engraved blocks through the early part of the next day, while Riffe and Hielman, as usual, wrought in the front shop at the old trades. In the afternoon Dritzhn relieved the two workmen, while they with Anna assisted Gutenberg. After a little practice, she could take impressions as well as her husband; and when she wearied of this, she made a strong paste, and under his direction commenced pasting the blank sides of the leaves together, for they were printed only on one side. In a few days they had a number of "Histories" bound and ready for sale. There was great rejoicing among those early workers over the beautiful books which were the result of their toil!

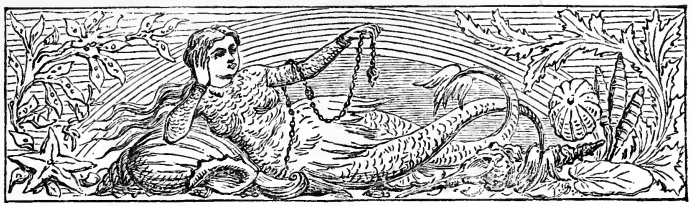
Now came the question how to dispose of them. The firm finally concluded to exhibit them two or three at a time in the front shop, and try the effect on customers.

Gutenberg, remembering the experiment with pictures, said little. He was, however, hopeful that they could in some way make a market for the edition in the course of a few weeks. If so, he felt that it would be a triumph of block-printing over copying.

But he was doubtful of the project of exhibiting them in the way proposed, as the more books sold, the less jewelry and mirrors. At length Peter

Schoeffer, a young man studying in Father Melchoir's school in an ante-room of the Cathedral, was engaged to offer them for sale to the few learned people in the place; for few, comparatively, knew how to read.

As the books were valuable, and only small sales could be expected, he was permitted to take only one at a time. The first week he sold two copies; and as one also was sold from the shop, the firm took courage — it was a success! At this rate the edition would speedily be disposed of.



VII.

Small Receipts. — Printing the "Donatus." — "Ars Memorandi." — "Ars Moriendi." — An Interesting Fact. — Extract from "Ars Moriendi."

AS time passed, the firm occasionally sold a copy of the "History," but receipts were smaller than had been anticipated. Few of the common people could read, —its circulation was therefore mostly confined to the priests and nobility. The former rarely needed to purchase it, as each one could, if he desired, secure one of the kind by copying; and trouble, expense, and time were involved in gaining access to the higher classes.

Gutenberg consoled himself by reasoning that his books would be called for gradually, and that he must as soon as possible issue another work suitable for a more accessible class. These were the youth in the Cathedral, studying for the priesthood, who were under the necessity of copying their "Donatuses," or manuals of grammar. Why should he not prepare an edition for their use? He would be sure

of some customers, and there would be no risk in trying his hand at a "Donatus." The firm at once went to work upon the manual, which was one of the first school-books adapted to beginners. The children and youth of four hundred years ago had few aids in study, and few were educated. The voice of the living teacher, usually a priest, served to make passable the otherwise inaccessible paths of learning.

As the busy company wrought on the "Donatus," the curiosity of certain neighbors was excited respecting the nature of their evening employment, and it was deemed advisable more fully to remove the hidden art to Dritzhn's shop, from which printing-office the new manuals of grammar in due time were issued. They sold more readily than the "History," and the edition of fifty copies was soon exhausted. Many of the scholars in the Cathedral school bought them; and for a time Gutenberg and his firm were busy in issuing and Peter Schoeffer in circulating the work. The lapidary and mirror arts were still pursued by turns, although very naturally the firm felt more interest in the fascinating occupation of imprinting. After a few weeks the demand for the "Donatus" almost ceased, the pupils in Strasbourg and vicinity having been supplied, and the means of communication with other places being infrequent. There were no newspa-

pers, and none of the methods of advertising now in vogue with publishers. Still the company was not discouraged; the sale of one book was a greater event then than is now the sale of many thousands.

The call for the "Donatus" declining, the inventor turned his attention to a work of quite a different description, which was a great favorite with the more devout monks. This was the "Ars Memorandi," or "Art of Remembering." We have no means of ascertaining the size of this book; but it could not have been large, as almost in immediate connection with it were engraved the blocks of a religious and devotional work called "Ars Moriendi," or the "Art of knowing how to Die." The numerous engravings illustrating these books, Gutenberg seems to have omitted.

These were comparatively new works, the first book having only been written in 1420, followed by other copies in 1430. Gutenberg's block edition was a great improvement on these, and soon became popular, being suited to the religious wants of the people.

It is an interesting fact that the second book, "Ars Moriendi," continued to engage attention for many years. It is also probable that it was the identical work on which Caxton, the first English printer, was engaged the last day of his life, the 15th of June, 1490, when he was about eighty

years of age. The work at that time bore the title "The Art and Craft to know well to Die."

If so, we have the inventor of printing himself, when comparatively a young man, issuing this important work, and the first English printer crowning his life-labors in bringing it before the world. The thoughtful and religious tone of this book may be gathered from the following passage from the preface: —

"When it is so that what a man maketh or doeth, it is made to come to some end, and if the thing be good or well made, it must needs come to good end; then by better and greater reason every man ought to intend in such wise to live in this world, in keeping the commandments of God, that he may come to a good end. Then out of this world, full of wretchedness and tribulations, he may go to heaven unto God and his saints, unto joy ever durable."

VIII.

Effect of Gutenberg's Books. — His Times and Ours. — His Books at the Cathedral. — Curiosity of the Monks. — Proposition of the Abbot. — The "Bible for the Poor." — A Great Work well done. —A Good Sale. — The Canticles issued. — A Difficult Undertaking. — Discontent. — An Accident. — Discovery of Separate Types. — The First Font of Movable Type. — Difficulties mastered. — The Great Helper.

IT is an interesting fact in the history of printing that its discoverer was led to issue works of an excellent and devotional character. As time passed, numbers were disposed of to the nobility, and occasionally one to some favored tradesman who had conquered his alphabet. Those who had purchased the "History of St. John," wished a copy; and families enriched with a "Donatus," cast about them to devise ways and means to buy the newer works of Gutenberg.

But what changes these books effected in the households blessed with their presence! "A man is known by the company he keeps;" and books are most influential associates. People who had

not dreamed of being able to buy a book, by the skill of Gutenberg suddenly found themselves enriched with the treasure. How the reader of the family dwelt on the magic page! for seldom it was that more than one member could read. How the little circle gathered round the fireside of an evening, listening to catch each word of the wonderful volume, which was read and re-read, discussed, approved, and mostly committed to memory. This eagerness of the more enlightened classes to own and read a book, may seem strange to us who all our lives long have been surrounded with books of all sizes, from the abstruse tome we pore over to understand, to the charming literary favorite that we read once and again with delight.

But our wonder will cease when we remember what a different state of things then existed. Books were so scarce, — and this very scarcity increased their value, — then they were made with pen and ink alone, except by Gutenberg, who kept the secret of his block process. People took it for granted that the books he sold them were manuscripts, slowly written by hand; and marveled much at their exactness and similarity.

Still, with all the interest excited by his books, an edition of some fifty copies, sufficed to answer the demand. The mass of the people were too ignorant to aspire to the possession of a book. They could

not read, and reasoned — if the subject came up — that books would be useless. To buy them, would be like purchasing a carriage when horses could not be had to draw it, or spectacles for a blind man, or shoes for one without feet.

As was his custom, whenever a new book was issued, the inventor visited the Cathedral with the "Ars Moriendi" to make sales. The visit was an event of moment to the firm, far more than a trade sale is to a publishing house of this day.

He first sought the Abbot in the library, whom he found sitting a little apart by a table, busily examining the work of the copyists.

"Good-morning, holy Father!" said Gutenberg.

"Good-morrow, my son: hast thou brought more of thy wonderful books?"

"That I have, Father," replied Gutenberg; and as he began to remove the coverings, several monks gathered around him.

"What hast thou here?" asked Father Gottlieb, a gray-headed friar; "more of thy magical books?"

"I claim no powers of magic, Father; it is simply patience that has done it!" and opening an "Ars Memorandi," he passed it to the critical monk. Then taking a copy of "Ars Moriendi" he courteously presented it to the Superior.

"Thank you, my son!" rejoined his Reverence graciously. "It is a pleasure to examine thy manuscript."

"Curious book!" exclaimed Father Melchoir, a middle-aged monk, who had himself just finished a copy of the same work, by the slow process of the pen, with incredible pains and much time. "How came you to make so many books all alike? How did you do it? You have a great company of scribes, eh?"

Gutenberg did not explain. Meanwhile the monks continued to gather; for having seen some of the former issues of the lapidary, they were the more eager to examine the new one.

"Very good! wonderful!" said one, as he turned over the pages of a book.

"It is not like the work of our hands," added another.

"But you have not answered my questions!" persisted Father Melchoir, piqued that Gutenberg made such a show of industry and careful penmanship.

"I can even tell thee that I have accomplished it by patience," was the inventor's reply.

"Why, we claim not to be wanting in that virtue," said Father Melchoir, "but none of us can compete with your speed in writing. Every few weeks you bring us in twelve or more books, all carefully written out in half the time it takes our readiest scribe to make one copy!"

"Moreover," added another, as he compared two

copies, "the letters are so exact and regular; why, these two copies have just as many letters and words on a page, made precisely alike!"

"But, the books are unadorned!" broke in Father Melchoir. "And very plain and poverty-stricken they look to me after gazing on our illuminated books, with their beautiful pictures, rich bindings, silk embroidered with gold and silver thread, and their backs of ivory exquisitely carved, or embellished with filigree-work and pearls and precious stones. One would suppose that a lapidary might at least use ornaments that are in his line!"

"I am not ambitious of adornment," answered Gutenberg. "I would greatly prefer to circulate twelve books in a neat plain dress than one in rich pictures and binding. My twelve books are made to be read; while an embellished copy is only fit to be locked up with clasps, and kept in a chest or cage, to be taken out on great occasions."

The Superior meanwhile had been absorbed in the copy Gutenberg had presented him, and appeared not to notice the conversation. He now motioned the monks to withdraw; then, turning to Gutenberg, said, —

"I have a word to thee, my son!"

"I am ready to hear, holy Father!"

"Are these books made with the pen of the copy-

ist?" and his keen eye fell on the lapidary with a searching glance.

Gutenberg was embarrassed for an answer.

"It is as I supposed," continued the Superior. "They are made by engraved blocks, like the 'St. Christopher' and the 'Biblia Pauperum.'"

Gutenberg saw that his secret was out; but his consternation was allayed when the Father added, "It may be that we can furnish you with a work to engrave and imprint. How would you like to undertake with the 'Biblia Pauperum?' The copy which belongs to our library is rudely executed, and I doubt not you would greatly improve upon it. It is so rough and uncouth that I sometimes think the original manuscript copy made by Ausgarius in the ninth century must have been a better specimen of art. Think the matter over, my son, and let me know your decision at an early day."

Gutenberg took leave, and on reaching home consulted the rest of the company about imprinting a new issue of the "Biblia Pauperum." It chanced that not one of the firm had seen the book, with the exception of Andreas Dritzhn, who once examined the copy in the Cathedral. He was in favor of engaging in the work, if the monks would take copies enough to pay them well for their labor. This was a point which Gutenberg was deputed to ascertain, that there might be no risk in devoting

the requisite time to perfect the engraving, — an undertaking of no small magnitude.

Accordingly, shortly after, Gutenberg made another visit to the Cathedral to confer with the Superior. He met with a cordial greeting, and almost abruptly the Father began: —

"And what is thy decision, son Gutenberg; wilt thou prepare for us new copies of the 'Biblia Pauperum?'"

"I shall rejoice to engage in the enterprise," was the reply, "if I can do so without too much risk, but it will be a slow and toilsome undertaking, involving much expense" —

"Which you will be paid for when it is finished."

"But who will buy the book?"

"A goodly number of priests will need copies," replied the Father. "The forty curious pictures of which the book is composed, were designed to illustrate a series of skeleton sermons. They are of great use in stirring the preacher's imagination, and storing his memory with excellent texts. The book, therefore, is mainly suited to the different religious orders, and will have sale chiefly among them. Still, as it is taken from the Bible, and called the 'Bible for the Poor,' others will buy it besides the priests, and it may have a wide circulation. Numbers will be needed to give the monks each a

chance to examine it as often as is desirable, although the different copies will be chained in cages, or on tablets, that no person may appropriate one solely to his own use."

This was an era in the affairs of Gutenberg. His art was acknowledged and patronized by the Superior, and he himself really promoted above the monks, who were prominent not only among the book-makers or book-sellers, but the literati of their day. Still Gutenberg, as he called to mind the jealousy of Father Melchoir, feared fully to rely on patronage from the friars; and it was only the assurance of the worthy Superior that induced him to engage in the expensive enterprise of bringing out a new "Biblia Pauperum."

"Tarry a little," said the Abbot, as the lapidary was leaving; "I will lend thee our 'Biblia,' for a copy." Then going to the side of the room where the light streamed in from a lofty painted window, he unlocked a cage, and taking the valued book from a gilded bracket, unfastened the chain which confined it to the wall, and, carefully wrapping it in paper, gave it to Gutenberg, who hastened away, intent on the new project before him.

Dritzhn had become a skillful engraver, but it was necessary to secure the services of two other wood-engravers, residing in Strasbourg, to whom the subjects were carried, — cuts being taken from

BLOCK-PRINTING FROM THE BIBLIA PAUPERUM.

the "Biblia" and given to them, one by one, as they could execute them. In this way the pictures were finished in the course of a few months. Gutenberg, Riffe, and Hielman engraved the inscriptions explaining the cuts, of which those at the top and bottom of the page consisted of Scripture and Leonine verses, so called from Leo, the inventor, the end of each line rhyming with the middle, as for example: —

"Gloria *factorum* temere conceditur *horum*."

The engraving of this "Poor Man's Bible" was a great work; and only the invincible energy, enthusiasm, and perseverance of those early artisans enabled them to accomplish it in so short a time. To form some idea of its magnitude, we must keep in mind that each page contained four busts, or figures of persons; the two upper ones represented the prophets, or others whose names were beneath them; the two lower figures are unknown, or can only be conjectured. In the middle of the pages, which are all marked by letters from the alphabet, were three historical pictures, one of which was from the New Testament.

A fac-simile of this curious and ancient work can be seen in the Public Library, Boston, and will richly repay the trouble of examination. This has, however, forty-eight engravings, which may indicate that the work, as first issued by Ausgarius in the

ninth century, was comparatively meagre, and grew to its present proportions by successive issues and by the hand of different artists.

In due time the firm was busy in imprinting and binding the choice volume, delighted with the good prospect of remuneration for it; and as soon as one copy was completed, Gutenberg again betook him to the Cathedral to exhibit it to the Abbot, who was warm in his praise of the work.

"This is as I would have it," said he, with a beaming face, "it is elegantly executed, and more in keeping with the themes which it illustrates. Our priests will now have no excuse for stupid sermons when they officiate in the chapel or cathedral. Thou hast done nobly, and thy labors will subserve the interests of the Church."

He then bestowed on him a generous sum, as an earnest of the full amount, when the copies he had engaged, were delivered; and Gutenberg, with a happy heart, despite the glance he had of Father Melchoir's frowning visage, returned to his cottage to rejoice with Anna.

"It is just as I anticipated," she exclaimed. "I knew thou wouldst triumph. Only to think, a real 'Biblia Pauperum' made by my John Gutenberg! I am proud and happy; we shall yet see good days. Then it will so enliven us to have a copy in the house, for I have thy promise of one of each book thou mayst make."

"Aye, my Anna, that is as little as I can do; when I get rich, I hope to add to thy wardrobe, as well as to our library;" and he glanced painfully at her plain russet gown, for through all his experiments she had practiced a rigid economy in dress.

"When thou art rich," replied Anna, "I will not refuse the gifts thy kind heart inclines thee to give; but for the present, I am content."

The "Biblia" sold better than any previous work, and Gutenberg and partners were much gratified. They did not, however, realize as much money as if they had kept to the lapidary and mirror business. The demand for books was so small, a market had to be created; and this required time and the slow progress of events.

But so much pleased were they with their endeavors, that, sanguine of still better success, they soon issued one of the books of the Bible entire. This was the Canticles, or Solomon's Song, and, like the "Biblia Pauperum," printed only on one side of the page from engraved wooden blocks. A copy of this work is carefully treasured among antiquities in the British Museum.

Such was the estimation in which it was held as a work of art, and such its sale, that Gutenberg was led to attempt greater things; he even conceived the idea of printing the entire Bible. Anna was greatly in favor of the undertaking.

"All thou wouldst have to do," said she, vivaciously, "would be to make more blocks, — a block for a page; and it would be so much better than copying. For a monk, if he lives to a good old age, and is diligent with his pen, can only write out two Bibles; and printing from blocks is much greater speed than that."

"True, Anna," was the reply; "but hast thou an idea how long it would take to engrave the blocks for the entire Bible?"

"Nay; but thou art so expert that assuredly it would not take thee long, — a few months, I suppose, at farthest. I do hope that thou wilt commence on this work at once. It is so desirable to have the Bible issued by thy art."

"But let us calculate a little, my dear Anna. There are seven hundred pages in the Bible. By close application, I cannot engrave carefully and suitably more than two pages a month; and I must be full three hundred and fifty months, or nearly thirty years, in engraving blocks enough for the Holy Book!"

"Why, that would be dreadful!" cried Anna in dismay. "Thou wouldst be an old man long before it was done; it would even take thy lifetime!"

"Yes, Anna, and this process of engraving fine letters on blocks, when pursued closely, is dimming

to the eyes; I should be blind before my work was half done."

"But thou couldst divide thy labors with thy workmen, couldst thou not?"

"Aye, if I can persuade them to undertake so formidable an enterprise. But the men are getting weary of large works, and beg me to choose smaller ones; they assert that the new process is no better for a large book than copying. Perhaps, however, we can issue the Gospels gradually, by taking one book at a time."

"Perhaps thou canst," echoed Anna sadly.

Although Gutenberg was depressed when he thought of the immense labor involved in imprinting so large a work as the Bible, yet he was not wholly disheartened. This was the secret of his success; he would not give up; was not frightened by difficulties; what the faint-hearted would deem impossible, he feared not to attempt. The art of printing would have remained undiscovered until this day without this courageous perseverance.

Gutenberg said nothing to his associates about attempting the execution of the whole Bible; indeed, he dared not entertain the idea himself; but he proposed that they publish the Gospels. They thought this too large a work. He replied that they could imprint the Gospel of St. Matthew, and do as seemed best about the remainder; this was complete in itself, and would find a ready sale.

Accordingly they were soon hard at the task of engraving blocks for the Gospel of Matthew. Dritzhn demurred, as he mechanically toiled away, saying, "Unless prospects brighten, we shall never get back our money."

Fault-finding is contagious; and Hielman and Riffe soon manifested a similar spirit. Those were gloomy days. Gutenberg meanwhile said little, but wrought at his block with renewed vigor. It was nearly completed; a few turns and gashes of the keen-pointed instrument, and it would be done; when by a slip of the hand the wood was split asunder!

Dritzhn looked up aghast, as much as to say, "How can we afford this great waste of time and labor?" Gutenberg's quick eye interpreted the glance, and his ingenuity was put to the test of repairing the loss. He commenced fitting the block together in order to save some of the work at least. While thus engaged, the thought occurred to him, What if the carved block were broken up into separate letters, so that they might be put together in any words desired?

He seized his knife and split the wood into the letters carved on its surface. Thus he had wooden type, which he arranged in various words. The light of a great invention had dawned. Absorbed in thoughts of its advantages, he heeds not the cu-

rious eyes of his comrades, as they intently regard him, wondering at his apparently aimless performance.

He was a philosopher, and in his search after the natural and practical came to reason thus : —

" I want a system of impressing characters suited to the language. In Latin there are twenty-four letters, and the same letters are used over and over to spell many thousands of words. In a page of words I employ portions of the alphabet a number of times ; and after I have done printing with the block, the carved letters are lost. If I could contrive a way of separating them, I could rearrange them without cutting new ones, and apply them to another page of different matter.

" I must, then, have my letters for printing, separate, like the letters of the alphabet, so that I can handle them as readily as I use letters to form words. I must carve the letters in wood with little handles to them, that I may take them up, and place them together as if I were spelling ! "

Thus did the patient hero seize upon the idea of movable type, — the key-stone of the art of printing. He soon tried another experiment ; splitting a block into strips, and working it down to the right size, he carved a letter on the end of it. This cost him care and labor, for it was more difficult than engraving on the solid block. Many bits of wood

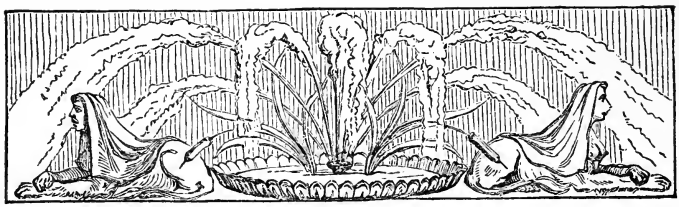
were carved before he succeeded in getting a letter to suit him. But after many trials he made one, then another, and another, taking pains to form the sticks of the right thickness, so that when they were placed together, the letters would not be too far apart.

When he had the alphabet carved, each letter on the end of a little wooden peg, he had twenty-four type letters, — quite a little pile, — which he regarded with pride and satisfaction, and called them *stucke*, or type. Like a child in his first efforts in reading, so he carefully spelt his way onward.

Bonus homo, "a good man," were the words he first tried with his type. Taking the bits of wood with the letters *bonus*, he placed them one after the other as he spelt the word, and fastened them together with a string. But when he came to the next word, as he had only one *o*, he stopped and made two more before the word could be set up. As he tried other words, he found that he needed more letters; so, taking time, he cut out a large number of types for each letter in the alphabet. These he placed separately in little boxes to prevent them from being mixed. There was the box of A's, the box of B's, the box of C's, and so on for all the letters. This was a font of movable type, the first ever made, and the great step of progress in his invention.

If you will try the experiment of cutting type out of wood, you will more readily perceive the difficulties attending it. It was the work of months to accomplish this, which we have noted in two or three pages.

As Gutenberg went on setting up *bonus* in type, he found an obstacle in keeping the letters together, so that he could rub ink on them and print. Evening came, and he took them home to remedy the difficulty, and notched the edges of the two outside letters, the *b*, and the *s*, that he might tie them firmly with the linen thread he had provided. This fastening them together, that they might bear the impression of the solid block, was also a study; but he was not to be turned aside by obstacles. He had energy, courage, perseverance, and ingenuity; for Providence was inspiring him for his work.



IX.

Anna's Disappointment. — Dritzhn's Regrets. —Comfort for Anna. — Gutenberg's Progress described. — The Great Enlightener. — Advantages of Movable Type. — Another Book. — Obstacles. — Criticisms. — Invention. — A Press contrived. — New Cause of Disquiet.

AS for Anna, usually so hopeful, she was much disquieted when her husband told her that block-printing was only suited to small books, and that some other method must be sought out, or he could not issue large works. She had her heart on retrieving their affairs by the sale of books, and was bitterly disappointed that the new art could not at once, if ever, bring the hoped for prosperity.

Dritzhn's life was embittered with vain regrets; each hour of the day was vocal with his murmurs and forebodings. Under these circumstances, Gutenberg did not feel free to take his rightful share of the small profits, and, in consequence, the allowance for family expenses was not sufficient to furnish his home with comforts and keep Want, the gaunt

wolf, away. And so it came about that one day Anna sat sewing in her dwelling, the picture of grief, and bitterly reproaching herself for the advice she had given her husband to turn aside from the sure returns of the artisan to the uncertainties of invention. The garment she was making fell from her hands, and she exclaimed, —

"Alas! I am the foolish woman that plucketh her house down with her hands! I had not the wisdom to give my husband good counsel!" Thus she bewailed herself with bitter tears and reproaches till evening, when, hearing Gutenberg's step as he returned from St. Arbogast, she quickly wiped away her tears, and strove to meet him with composure.

"Why, Anna!" he cried, as he beheld her woe-begone face, "art thou ill? Are our friends dead? Speak, and tell me!" And as she revealed the source of her disquiet, he said cheerily, —

"My Anna, thou must take a juster view of things. Brighter days are in store for us. Thou dost not know what I have discovered!"

"But I know too well what *I* have discovered," she rejoined; "it is that we are beggars. There is no food in the house, and I can go no more to the provision merchants until they are paid. It is dreadful to think how we have spent our money!" To such an extremity of speech was poor Anna brought in her trial.

"O Anna! Anna!" exclaimed Gutenberg, distressed for her, "dost thou see these bits of wood? I have cut a letter on the end of each. I fasten them together thus;" and he held up the type of the word *bonus*. "I ink them, and press them on paper thus. See how beautifully they print;" and he showed the word impressed in clear characters.

"But is it not presumption to trust longer to uncertainties?" cried Anna; "they cannot bring food into the house. We are poor."

"My Anna," soothingly said the kind husband, "dost thou forget that I have conceived a great invention, and that thou art really as rich as a queen?"

"O, the wild dream!" returned Anna, smiling through her tears, comforted by his sympathy, "I shall trust it when it pays our debts, and feeds and clothes us. We are verily poor, and I see not how vain imaginings can help us."

"But, dear, my patrimony is not all gone. I have land still unsold at Mentz; and as I cannot realize money from these immediately, I promise thee that if this invention does not help our affairs in a month, I will relinquish it for the present, and return to polishing gems for a livelihood."

It was a rough and thorny way that the inventor trod, reaching after that great gift which God held out to man, and no wonder that Anna, in this time of trial, pleaded with him to turn back, watering his path with her tears.

Gutenberg slept little the night of the revelation of movable type. He deemed the invention most important; and before his mind, stimulated to unusual action, some of the great changes which would ensue from his discovery, were dimly portrayed. Like the prophets who understood not the full import of their own utterances, but inquired diligently to know what the spirit which was in them did signify, so the discoverer of the wonderful art could only hope that it was the introduction of something glorious; and that hope was thenceforth his guiding star amid the darkness of his earthly lot. With the first ray of morning he was at his work, to test more fully the new types. Setting them up, he fastened them together, and printed the same words as before. *Bonus homo* shone with the halo of *eureka* to Gutenberg's eye. "I have found it!" he exclaimed, and, starting off to market, brought home food for the day.

Gustav Nieritz, a German writer, thus describes Gutenberg's progress: —

"He set to work with the utmost eagerness. Out of a piece of hard wood he sawed some thousand tiny blocks, a few inches long, and very narrow. At one end he cut a letter in relief, and bored a hole through the other. After having thus furnished himself with a considerable number of the letters of the alphabet, he placed whole words together,

and arranged them in lines on a string, until they formed a page, when he bound them together with wire, and so prevented their falling asunder. He then blackened his wooden type with ink, and taking up the whole together, pressed upon it a sheet of paper. And now let us place ourselves in his position, and enter into his feelings as he beheld the first fruits of his long, unwearied labors.

" With a trembling hand he caught up the printed paper. It had succeeded beyond his expectation. Tears ran down his cheeks as he gazed on it with ecstacy. It was the Lord's Prayer, with which he had made almost his first attempt at printing with types.

" Often had his lips uttered the words of prayer, whilst he was thinking only of his invention ; now, however, their meaning came clearly upon his mind, and his grateful soul turned fervently to the Father of all light, from whom this light also had come, which would enlighten men as no other human invention could do. He fell upon his knees, holding the sheet of paper in both hands, and repeated the prayer it contained with his whole heart. O ! it was not for the sake of worldly gain that he rejoiced in his discovery. It was that it freed him from the debt that he had long ago incurred. He might be called a dreamer and an idler: he neither heard nor regarded.

"'Anna!' he cried, throwing his arms round her, 'here is the gold brocade cap, and all the rest besides which I promised you. I have succeeded, and our fortune is made.' His wife shook her head incredulously, and said with a sigh: —

"'I wish you would give up these fancies, and return to your work.' Gutenberg smiled, but persevered."

"My Anna!" said the inventor, some little time later, as he showed her other specimens of his work, "I trust that our poverty will soon be over. You shall yet ride in a coach, and dine like a queen. My invention is a certainty."

"I only wish comforts and a competence," returned Anna tearfully.

"We are sure of both," replied he. "Let me tell thee, wife, nothing yet invented by man, ever made such inroads on ignorance as this will effect. Almost everything we know, we have acquired through the medium of either spoken or written language. The mass of the people are only acquainted with the former. Everybody will, by and by, learn to read and understand written language, and the knowledge locked up in cloisters will be freely poured out to the thirsty multitudes. It is through language that we become wiser and better; and if my discovery succeeds, as it must, the knowledge of the arts, sciences, and religion will be sooner or later spread

abroad. Then, no more hoarding of libraries that kings, prelates, and priests alone may read; but the common people, too, will have their books." Anna listened with pleased interest, and he went on: "God has bestowed great honor on books, as some of the devout authors say, in communicating with us through them; and if holy men of old who spoke as they were moved by the Holy Ghost had not written down what God taught them, where to-day would be our knowledge of our sacred things? And if it was important for God to record his will, may we not suppose that He will give wisdom so that a way may be devised to publish his Word with facility?"

"I must think so, my Anna," he added, "and I cannot doubt that He has given me skill in what I have undertaken. It grieves me to think what you must have suffered through it, but I trust our days of mourning are ended;" and his happy smile lightened her heart like a sunbeam.

It was still quite early in the day when Gutenberg repaired to Dritzhn's shop, to exhibit to his associates his invention of separate types. As he entered, he was struck with the settled gloom that rested on Dritzhn's face. "My improvement has occurred in good time," thought the inventor; "my partners are getting discouraged."

"I have something new to show you," said he to Dritzhn, who was busy engraving the first verses of the third chapter of Matthew.

"New things have nearly ruined us!" retorted Dritzhn, looking up moodily from his work.

"But this is a new method of imprinting, which will save much of our labor," said Gutenberg, showing the specimens of *bonus homo* and the "Lord's Prayer."

"How does this mode differ from ours?" asked Dritzhn. "You impress with the block, do you not?"

"Nay; I first make letters on bits of wood, tie them together to impress with, and, after using them, take them apart, and set them up for new words."

"And this tying together and taking apart would consume time," objected Dritzhn. "I see no advantage in this mode; in my opinion, it would involve us more deeply."

"But let us try it," interposed Hielman; "if it will save labor, it is a good thing."

"Leave well enough alone! I think we shall do better to keep on as we have begun," said Riffe, with the air of one who had settled the matter.

"Block-printing is by no means to be despised," answered Gutenberg, "in books of a few pages; but in a large book of many pages, we waste time in cutting letters, as they are only of use for that book, and cannot be taken apart and used for another."

"I am opposed to any change," Dritzhn reiterated; "we are sufficiently involved without any new experiments. We cannot do better than keep on with the block books."

Gutenberg had failed in convincing these men, but he was confident that the practical working of his separate types would yet be an argument they could not resist. He persevered in his experiments, and, in place of engraving on the block, busied himself in adjusting and readjusting his type for the "Lord's Prayer," as he found a difficulty in keeping them in place, when he took a second impression.

Dritzhn and Riffe, having little fellowship for this new way of "spending time," were ready to criticise when the types slipped out of place, as Gutenberg tied them with thread or twine. But before the day was over, he had managed to take several good impressions of the "Lord's Prayer." This was well enough, Dritzhn said, but still insisted that he did not see how it was better than if taken with an engraved block, and was in no mood to investigate the matter with candor.

The partners had previously decided to publish the "Speculum Humanæ Salutis," and they now commenced upon it. The "Speculum" suited both parties, as there were plenty of subjects requiring wood-engravings, and the movable type could also be used in the written portion of the book.

As Gutenberg wrought at his types, he had still to combat the difficulty of making them hold together with sufficient firmness. At first he used strings, then wires. These were easily displaced, and cost him many a hard job of repairing damages, which confirmed Dritzhn and Riffe in the opinion that it was useless to attempt to make them work. It was not reasonable, the former said, that such bits of wood could be made serviceable in book-making. There was some sense in a solid block, and his advice was to keep on in the old way, with which, however, he was often finding fault, for he had enlisted in the enterprise not so much for the love of the art as the love of money. Months of toil and large expenditures had brought comparatively small returns. Some of the firm even began to talk of returning to the old occupation of polishing stones. Riffe continued to echo Dritzhn's criticisms and complaints.

"Why not keep on with block-printing?" asked the latter, as Gutenberg was busy cutting out his type, or *stucke* as it was called. "I've just got my hand in, and do not wish to give up the trade for whittling sticks, of which I do not see the use."

"Let me try once more to explain the use," pleasantly replied Gutenberg. "Suppose the letters of the alphabet were tied together so that you could not separate them, how could you spell words?

The letters on a block cannot be taken apart to form other words; but with the separate types it is very different;" and to illustrate his meaning he set up a word in type, printed with it, took the letters apart, or "distributed" them, and framed another word.

Although slow to be convinced, his associates finally acknowledged the necessity of movable type and began to acquire some degree of skill in making them.

An advance on the method by cords and wire, was Gutenberg's invention of a frame with wedges to keep the types in place. This had the approbation of his partners. It was a great gain, and there was much congratulation when he succeeded in firmly adjusting the *stucke* so that they had all the the advantage of the solid block, with none of its disadvantages.

Taking impressions of the type on paper by friction was slow and unsatisfactory; and Gutenberg, after many experiments, contrived a press to imprint with, and employed a skillful mechanic to make it. This saved, besides other labor, the trouble of pasting the blank backs of the leaves together, as both sides of the paper were imprinted.

A distinguished writer, who assures us that he has had access to the archives of Strasbourg, thus vividly describes this discovery; "Months and

years had been consumed — his fortune also and the funds of the association — in patient experiments, in successes, and in reverses. At length, having made a small model of a *press* which appeared to to him to combine all the conditions of printing as he then understood it, he hid the precious miniature under his cloak, and, entering the city, went to a skillful turner in wood and in metal, named Conrad Sachspach, who dwelt at Merchants' Cross-roads, to ask him to make one of a large size. He left the secret in the machine, only telling him that it was a contrivance by which he proposed to accomplish some *chefs d'œuvre* of art and mechanics of which a slower process was known. The artisan, taking, turning, and re-turning the model in his hands, with a smile of disdain at the rough sketch completed by Gutenberg, said to him, with a bantering air : —

" ' This is only a simple wine-press that you ask me to make, Master John ! '

" ' Yes,' replied Gutenberg in a serious and dignified tone, ' it is a wine-press in effect, but it is a press from which shortly shall sprout forth floods of the most abundant and the most marvelous liquor that has ever flowed to quench the thirst of man. By it God shall spread his Word ; from it shall flow a fountain-head of pure truth. As a new star, it shall dissipate the darkness of ignorance, and

cause to shine on men a light hitherto unknown!' He withdrew. The mechanic, who understood nothing of these words, executed the machine, and returned it to Gutenberg at the monastery of Arbogast. This was the first press.

"In giving it into the hands of Gutenberg, the workman began to suspect some mystery. 'I see clearly, Master John,' said he to Gutenberg, 'that you are indeed in communication with celestial spirits; so hereafter I shall obey you as one of them — as a spirit!'"

This first press, contrived in the gloomy recesses of the old monastery, was set up in the printing rooms of Dritzhn's dwelling, but was not at first fully appreciated.

Two years passed, the company cutting a supply of movable type. Some sales were effected, but financial affairs were not flattering.

Meanwhile a new cause of disturbance occurred to impede progress, and waken in Gutenberg's partners doubts of his uniform infallibility in invention.

It was discovered that ink softened the type, and injured the shape of the letters.

Riffe, one of the first to notice it, became alarmed.

"It is my mind," said he, "that the bubble has burst. We may as well give up, and engage in

our old trade. These uncertainties will never bring grist to the mill."

"The type does not print as well after it becomes softened by the ink?" said Dritzhn inquiringly to Gutenberg.

"We must expect difficulties," was the reply, "and seek to overcome them. We must make more fresh type until we can contrive a way of hardening the wood."

At this the firm murmured against him afresh; nor were they better satisfied as time went on, and "John Dunnius' bill of one hundred florins was sent in for press-work."

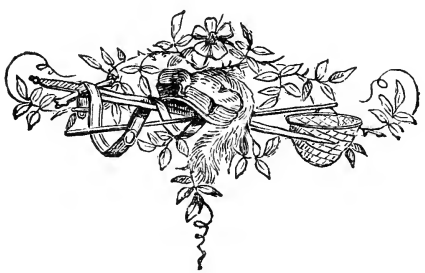
"Monstrous!" exclaimed Hielman; "we can never afford it."

"It is all pay out in this business," Dritzhn added, "and almost nothing coming in to balance the loss."

"Wait a little," was Gutenberg's reply; "we are now sowing the seed; by and by we shall reap our harvests." And he further appeased their agitation by calling attention to the satisfactory working of the press, and reminded them of the great service it was to them.

"Do you not see," said he, "that our labor of making *stucke* is nearly useless without the frame and press? We must either give up the art, and disband, or make the necessary improvements as they are called for."

While feeling keenly the murmurings of his associates, most indomitable was the spirit that he cherished, having the indispensable attribute of the true inventor, — a passion for his calling, and confidence in ultimate success.



X.

A Partner at the Confessional. — His Death. — Consequences. — A Lawsuit. —Thieves. — Dangerous Curiosity. — Destruction of Gutenberg's Type. — Curious Testimonies. — Value of the Legal Document. — Proof that Gutenberg was the Real Inventor. — The Magistrate's Just Judgment. — Public Excitement.

POOR Dritzhn! he was sadly lacking in the spirit which upheld Gutenberg. He was a plain matter-of-fact man, with none of the originator, — content to plant in the spring and reap in the autumn, to work in time-worn paths; but dubious things that were years in maturing, were not suited to his nature. The possibility of failure poisoned his enjoyment, palsied his hand, and enfeebled his step. And this, in 1438, after the short space of two years of suspense in the firm.

Father Melchoir, his spiritual adviser, noticed the change.

"My son," said he, "something troubles thee; confide the matter to me; perhaps I can help thee."

"I am indeed in trouble," replied he, glad of a

confidant, for the secret and the doubt of success together wore on him. "I fear that I shall be ruined as to worldly prospects."

"I trust not: how is it, my son? From what source is the danger?"

"Alas, Father, gladly would I tell thee, but I have bound myself with an oath not to reveal the secret."

"But, my son, the Church does not recognize oaths in such a case. They are null and void for all purposes whatsoever, and thou art free to tell me all thy heart at the confessional: it is even thy solemn duty to do so."

Dritzhn was only too easily persuaded, and, despite his sacred oath, told Father Melchoir of his connection with the firm.

"I have given hundreds of florins," said he, "to bring out a hidden art of writing, with the hope long ere this of selling books and getting profits from my money. A few have been sold, but I have received no dividend. Besides, I have earned but little by my trade for these two long years; my time has been thrown away, and I am poorer than ever."

"A very sad case!" said Father Melchoir, compassionately.

"This load is too heavy for me to bear," lamented Dritzhn; "it will kill me! To think of

throwing away hundreds of florins on a doubtful art, without in return getting back a single obolus![1] What can I do?"

"Get free from this secret league as soon as possible, and resume thy trade."

"I wish it could be done, Father, but I fear it cannot. If I leave the firm, I shall lose all chance of getting back the money I have lent them. I am in doubt what to do."

"Leave it by all means!" cried Father Melchoir; "be sure no good will come of their arts."

"I will see what I can do," said Dritzhn, and he rose to go. As he entered the shop, he found Gutenberg, Hielman, and Riffe busy setting new type for another work. It was a dictionary, called a "Catholicon." They were all eager in their toil, and spoke warmly of the ready sale it would find, and the money it would bring in. Dritzhn, a little encouraged, resumed his work with them, nor did he breathe a word of his plan of leaving. It was too great a step to take hastily, although he wished himself safely out of the partnership.

There was so much repairing of type to do, and so many unlooked-for hinderances, that the book was delayed, and 1439 came round before it was finished, although Gutenberg was meanwhile steadily improving his art.

[1] The very expression of Dritzhn at confessional.

At this point of time, the autumn of 1439, just when they were about realizing their hopes in issuing the "Catholicon," an event occurred which threw everything into confusion. This was the sudden death of Andreas Dritzhn. If ever the adversary hindered an enterprise, it was the art of printing; he had doubtless reasons of his own for multiplying obstacles.

Accordingly the death of Andreas was the pretext; and directly George and Nicholas, brothers of the deceased, two sturdy jogging Germans, who never harmed a fly, on arriving home from Andreas's funeral, demanded of Gutenberg, Hielman, and Riffe to be admitted to the partnership!

"Very good," said Gutenberg; "if we can find it in the contract, it shall be done." Then, producing the document, he read: —

"Art. 2. If any one of the partners shall die during the copartnership, the survivors shall pay to his heirs the sum of one hundred florins, in consideration of which the effects shall become the property of the surviving partners."

"Nay, gentlemen, you cannot become partners, but we will pay you what is due as the heirs of Andreas Dritzhn." Then, looking over the accounts of the firm, he added, "Your brother is indebted to us in the sum of eighty-five florins; we will pay you the remaining fifteen, which will balance accounts."

George and Nicholas rejected the offer with disdain, and, hastening away, conferred with each other as to what they should do. Two strong principles were at work in their hearts, — avarice and curiosity. From some few hints which Andreas had dropped while living, George and Nicholas were as much excited about the hidden arts of Gutenberg as we covetous moderns are with a chance at a rich vein in a gold mine ; and they determined to try a suit at law, and if possible become members of the secret league.

This was in the autumn, and was peculiarly grievous to the inventor. The lawsuit consumed his time, thwarted his plans, and there was great danger that the secrets of his art would become public. The protection of the patent offices was then unknown. No inventor could put in a *caveat* to hinder the encroachments of trespassers. The lawsuit had bruited abroad that Gutenberg & Co. had a secret art, which, like the philosopher's stone, turned everything into gold; and curiosity, on tiptoe, used every device to get a peep at the wonder. Gutenberg's work was at an end. It took all his time to attend the courts, and watch his shop, that no one might steal his art. It required double diligence to do the last, as the shop was in Andreas's house. Despite his cautions to Hielman and Riffe, one day, in his absence, George and Nicholas man-

aged to take from the shop a part of the printing apparatus. Gutenberg then gave orders to his servants to convey secretly to his house a printing-press and a quantity of letters cut in wood. The theft was a source of great anxiety to him, as he feared that the secret was out. The careful thieves, however, safely hid their booty, and lisped not a word.

At length it became evident to Gutenberg — such was the pitch to which curiosity had risen — that every vestige of the noble art must be destroyed. It was not safe even to hide it in his own house.

"Take the *stucke* from the forms," said he to his associates, "and break them up in my sight, that none of them may remain perfect."

"What, all our labor?" cried Hielman; "here we've been at work these three years!"

"Never mind," replied Gutenberg; "break them up, or some one will steal our art, and we shall be ruined!" and with that they set to work with their hammers and mallets, and the *stucke* was soon demolished. His precious type lay in the dust, and still the lawsuit was lacerating his sensitive mind.

The following curious testimony was given during this trial: —

"Anna, the wife of John Schultheiss, an engraver on wood, deposed, that on one occasion

Nicholas Beildeck came to her house to Nicholas Dritzhn, her relation, and said to him, 'My Nicholas Dritzhn, Andreas Dritzhn, of happy memory, has placed four pages (*stucke*) in a press, which Gutenberg has desired that you will take away and separate, that no man may know what they are, for he is unwilling that any one should see them.'

"Also John Schultheiss says that Laurence Beildeck [Gutenberg's servant] sometime came to his house to Nicholas Dritzhn, when Andreas Dritzhn his brother was dead, and that the said Laurence Beildeck thus spoke to said Nicholas Dritzhn: 'Andreas Dritzhn, of happy memory, has placed four pages on a press, which John Gutenberg desires you to take therefrom, and break them from one another, so that no man may see what they are.'

"Also Conrad Sachspach deposed that sometime Andrew Hielman came to him upon the Street of Merchants, and said, 'My Conrad, as Andreas Dritzhn is dead, and you made that press and know all about the matter, go hence and take the pieces from the press, and lay them separate from one another, so that no one may know what it is.'

"Laurence Beildeck says that he was sent by John Gutenberg to Nicholas Dritzhn, after the death of Andreas his brother, to say to him that he should show to no one the press that he had, and that he should see to it. He added that Gu-

tenberg had moreover commanded him that he should go suddenly to the presses, and open that press [frame] which was furnished with two *screws* or spindles (*cochleis*) that the pages should fall into pieces, and place those pieces within or upon the press, so that no one should see the matter, or understand what it was.

"The same witness also said that he knew well that Gutenberg, a little before the Feast of the Nativity [Christmas], had sent his servant to take away all forms, which were broken up in his sight, that none of them might be found perfect. Moreover, after the death of Andreas, the witness was not ignorant that many were desirous of seeing the presses, and that Gutenberg had commanded that some one should be sent who might hinder any one from seeing the presses, and that his servants were sent to break them up.

"Also John Dunnius, goldsmith, said that three years or thereabouts previous, he had received from Gutenberg about three hundred florins for materials relating to printing."

All this affected the Strasbourgers, both priests and people, very differently from what it does ourselves. We prize it as a legal document, showing the existence of separate types, and also two presses, one of them made by Conrad Sachspach and the other by John Dunnius, to whom the firm

paid three hundred florins for press-work done in December, 1436. These presses served very different purposes, as Gutenberg commanded his servant to "open that press which was furnished with two *screws* or spindles." Plainly one was the "chase" for type, and the other the upright frame with a screw, which moved down the platen to impress the paper placed upon the type. We learn also that the art was a secret at the time when Laurentius Costar lay at the point of death, and those mistake who give him the honor of inventing printing.

We can picture to ourselves the excitement which prevailed, when a man of Gutenberg's firm character was led to make such utter destruction of his property after the disclosures of the lawsuit. He may have feared that a lawless mob would in vade his shop, and scatter the proofs of his inven tion, and that some person of ingenuity would get a clew to the art, and rob him of his sacred rights. What hours, days and nights of solicitude he suffered! Those only, who in a good cause have met the scoffs and jeers of the rabble excited by unscrupulous leaders, can well imagine the inventor's emotions.

Happily, Anna was equal to the emergency, and became a very heroine. She had no idea of being crushed, although for a little while she had given

way to despondency, and her strong-hearted courage inspired her husband. His home was a little paradise of peace, the resort of flowers and birds and all beautiful things which she instinctively gathered around her. God's gracious smile rested upon it, and in this sanctuary Gutenberg's wounded spirit was soothed; here he gained strength, and girded on his armor anew for the battle of life. The fiercer the strife without, the more blessed the peace within this retreat.

The lawsuit dragged its slow length on until December 12th of that year, when the magistrates gave judgment relieving Gutenberg from "the unjust demand of George and Nicholas Dritzhn, upon the payment of the sum of fifteen florins, being the difference of the sum of one hundred florins due to Gutenberg by Andrew on the original contract."

This was just what Gutenberg had proposed at first; and his adversaries had their trouble for their pains, without, perhaps, the consolation of knowing how much they had annoyed him. The lawsuit was over, but it had exposed the state of Gutenberg's affairs, and people were curious to learn more. Rumor was busy with her thousand tongues. "He is not willing that any one should see!" "Something wrong!" and in the spirit of the superstition of the times, many cried out, "Mystery! Witchcraft!" The whole community was in a ferment.

Time passed, and a little before the Feast of the Nativity, so faithfully had Gutenberg's orders as to the destruction of the press and type been executed, that nothing remained of the wonderful art, which since the death of Dritzhn, had so much disturbed the good city of Strasbourg.

XI.

Benighted. — Minstrel of the Hearth. — The Black Art. — A Barefoot Friar. — Popular Prejudice. — Hopes and Fears. — Gutenberg returns to his Trade. — Dissolution of the Copartnership.

THE country of the Rhine was visited by a wintry tempest from the North Sea. Benighted, Gutenberg, wrapped in his monk's cloak, little heeded the roaring winds and cutting blasts, as, after destroying the work of years, he bade adieu to Dritzhn's shop, and hurried homeward. The storm of life, the contest with his fellow-men, was more pitiless to him than the fierce raging of the elements.

It was quite dark when Anna, placing a light in the window, stirred the fire, and sat down to await his coming. The supper table was invitingly spread, and the covered dish of food placed by the fire to keep warm.

"Why does he not come? May God preserve him from unreasonable men;" and she caught up her work to while away the time. An hour passed, seeming to Anna much longer, when a cricket,

warmed into consciousness by the genial heat, hopped out of his covert, coated with dust, and blithely sang.

"A good omen!" mused Anna; and shortly after, true enough, there was a stamping on the step, and a shaking of garments; and, springing to the door, she welcomed her husband.

"O, it is yourself! come at last. But you look like a huge white bear!" And she gayly laughed as she drew him in, and brushed off the snow. "I was in fear lest some evil had overtaken you, until our dear little cricket piped on the hearth, as if to assure me that you were almost here."

"Yes," replied Gutenberg, throwing off his cloak, and hanging it on its peg in the corner, "and my Anna and my home welcome me as cheerily as ever."

"We at least ought to comfort thee when the world without weareth such dark frowns."

"Aye, aye, there is need of comfort. But I divine that some one has been here in my absence, and given thee cause of anxiety."

"O, nothing worth minding," returned the little wife. "Let us sup, and speak of the bright side of life."

"I am puzzled to find it; but thou canst point it out doubtless."

"Shall we forget," said Anna, "the mercy and

the blessing that we are spared to each other, and that no lawless mob has invaded our peace?"

"Aye, we do well to remember that it might be worse with us," was the reply; and having reverently said grace, for a time supper was discussed in silence, for Anna's last question had awakened grave thoughts. Suddenly the cricket broke out anew with his shrill note.

"What does the creature mean?" asked Gutenberg. "Does he dream that it is summer?"

"Bethink thee; he is the insect prophet of hope. He is saying, 'Bright days are coming, never fear!'"

"I trust the hearth minstrel is right; he will at least be useful in making me sleep well; his song sounds like a lullaby! But now that supper is over, what of thy visitor?"

"It was John Schultheiss' wife," replied Anna.

"That dark-browed woman! Why came she?"

"To comfort me with evil tidings; to tell me that it had been clearly proved in court that thy hidden art was no better than witchcraft, but that such was the inefficiency of the magistrates that they gave decision in thy favor. Some believe that thou art in league with the devil, and can enchant them or spoil their goods."

"What superstition!" exclaimed Gutenberg; "this comes of ignorance, and the scarcity of books!"

"I did not reason with her, or make reply, and she soon left; and soon after, Simon, the Barefoot Friar, appeared. His religion, as you know, consists in clothing himself in rags, begging from house to house, and paying for his welcome in prayers and benedictions. As I opened the door in answer to his loud knocking, he cried out, 'God save the house!' then, as he came in, added, 'God save the house, and all that's in it! God save it to the north!' and he made the sign of the cross in every direction towards which he turned. 'God save it to the south! † to the east! † and to the west! † Save it upwards!' turning his eyes heavenward, and crossing himself, 'and save it downwards! † Save it backwards! † and save it forwards! † Save it right! † and save it left! † Save it by night! † and save it by day! † Save it here! † and save it there! † Save it this way! † and save it that way! † Save it eating! † † † and save it drinking! † † † † † † † † † Oxis Doxis Glorioxis, Amen.'"

Gutenberg joined Anna in a merry laugh at this farce, as she went on rehearsing the idle priest's performance.

"'And how are you, gracious lady, now that I have blessed the place in the name of Saint Peter and all the Apostles and the nine patriarchs? Isn't a merry Christmas coming to you? And isn't there plenty of good cheer in the house?' So I made

him welcome, giving him a seat by the fire, and a dish of the best food the house afforded.

"'You don't say that you're prospering,' said he, as I helped him to the second supply; for he ate like some great animal.

"'We are in trouble!' I answered.

"'I know it!' he exclaimed, with a laugh, munching a mouthful and clapping his hands. 'I had it revealed to me! I know all about it; and I know the prayer for it. Oxis Doxis! † † † If you'd only sent to me in the first of it, I could have kept your trouble back, and I can now be a hindering cause to it, and get you safely through, for I know the prayer for it; Oxis Doxis! † and I'll go at it directly when I get refreshed.'"

"His own comfort first!" said Gutenberg, laughing.

"Yes," replied Anna, "and isn't he a good specimen of that class of priests, who are really only beggars? All so wise in their own opinion, and so ready to instruct every one they meet. How different from the devout and learned priests who minister the services of our holy church!"

"But how didst thou get rid of him?"

"After he had eaten like a glutton, he was ready to give me religious instruction. 'Do you know, gracious lady,' said he, devoutly crossing himself, 'that you are the very likeness of the Blessed Vir-

gin? I know it, for she communicates with me from heaven.'

"'Does she speak to you, Simon?' I asked.

"'The Blessed Virgin herself does so, and no one else,' he answered. 'And now let me tell thee, daughter, what she said to me only last night. I was just composing myself to sleep, after opening my window a little ways to let her in, — for she is in the habit of appearing to me, — when a silvery cloud came floating through the air, and the Blessed Lady alighted, came in, and took her seat upon my bed. I made haste to say my "Ave Maria," she the while sweetly smiling; and after I had said *Ora pro nobis* exactly nine hundred and ninety-nine times, our holy Queen of Heaven and Mother of God opened her ruby lips, showed me her pearly teeth, and revealed to me that the Barefoot Friars are the dearest to her of all the orders of monks; and she showed me an easy way to get to heaven, making me a solemn promise that whoever dies with a Barefoot Friar's cloak on, shall assuredly go to heaven.'"

"The impostor!" exclaimed Gutenberg. "Does he teach such doctrines as these? Of what avail could his cloak be in such a matter? I do not wonder that John Wickliffe was stirred up to denounce such men almost a century ago!"

"When I remember," said Anna, "that Henry

II. found out one hundred murders committed by priests, I am afraid to refuse the beggar friars when they ask for food. I know not what they might do when angry. They would at least curse me, and call down the judgments of Heaven."

"Which would harm thee as little as it did Wickliffe," said Gutenberg. "It is related of him that when he was very sick, the friars burst into his room with abusive language and curses, prophesying his death and torment, which so roused him that he sprang from his bed and drove them out, saying, 'I shall not die, but live to declare the evil deeds of you friars.'"

"Would there were more like him!" said Anna.

"We have some pious priests," replied Gutenberg, "but others are corrupt and time-serving. Occasionally one studies the Bible, and is guided by its precepts; but there are so few copies of the sacred Word, that all cannot have it if they would. If its laws were more generally known, there would be a reformation in the lives of many of these men. I had my heart on multiplying copies of this Book of books, but alas! my plans have been frustrated!" and the tears dimmed his eyes.

"Never fear, thou wilt yet be prospered," returned Anna, soothingly. "Wickliffe did not fail in what he attempted, neither wilt thou fail of accomplishing something worthy of thy aims and efforts."

"But my work is done in Strasbourg. I cannot stem this tide of prejudice and jealousy."

"Strasbourg is not all the world," rejoined Anna. "We can remove where people and priests are not against thee."

"But unless God interposes," said Gutenberg, "I have no hope that I shall ever return to my art."

At the close of the lawsuit, Gutenberg found himself overwhelmed with debt. His presses, type, and all his printing materials were destroyed. He was a poor man, and must start anew in the world. And such was the popular prejudice against his beloved art, that he saw it was useless to attempt it again. Besides, Riffe and Hielman were now wholly averse to the business; they urged that it had never been profitable, and that defeat and disaster had attended its prosecution. It only remained for them to resume the lapidary trade in the little shop of Gutenberg's cottage. This served a good purpose in allaying the excitement which had been stirred up by the revelations of the lawsuit. And the inventor was thankful that he had something positive to fall back upon in the hour of his extremity, and often contrasted his condition with what it would have been otherwise.

With the weight of a bitter disappointment resting upon him, he wrought successfully at his trade,

despite the efforts of certain evil disposed persons, who sought to crush him in the hour of his defeat. Now he had little intercourse with his fellow-citizens and the monks of the Cathedral, save in the way of business. It was the time of his reverses, and he had fewer friends than formerly.

By constant application he managed to get a comfortable support and pay his most pressing liabilities; for the rest he suppressed his noble tastes. It was vain to stem the tide of poverty, ill-will, and evil surmisings which would infallibly meet him, had he the means even to attempt the prosecution of his favorite aims. Yet in his dreams he was often cutting type and working his press as of old. How he sighed to find them only dreams!

Thus, with alternations of hopes and fears, the latter predominating, passed the period till the close of 1441, at which time he was glad to be released from all connection with Riffe and Hielman. There was little congeniality to make their daily intercourse agreeable, and no one of the firm proposed another term of contract.

XII.

Congenial Quiet. — Making Type again. — Gutenberg issues "Absies." — Peter Schoeffer. — Decides to remove to Mentz. — Emotions of Gutenberg. — Fraternal Sympathy. — The Meeting with Faust. — Table Talk. — Removal.

THE dissolution of the firm was in some respects a benefit to the lapidary. He had time for quiet thought, and, as in years gone by, his shop was his sanctum. Feeling at ease, his work progressed rapidly, and his day's task was often accomplished ere the sun declined, when instinctively his hand followed the bent of his mind, and engaged in cutting *stucke*. He said nothing of this to Anna, until, by accumulations of spare hours' work, he had made a fount of type. He then surprised her by showing his treasures.

"That is so much like thee, John!" she exclaimed. "I do believe thou wilt yet even receive the reward of thy perseverance; but thou canst not attempt great things now, not having the means of making a press, and with no one to assist thee."

"I have made this type in the leisure after my daily work," was the reply; "I can, moreover, devote a portion of my energies to preparing apparatus for imprinting; it will, however, avail me little in this place. Nevertheless, I shall work on, hoping that it will at some time turn to account."

Gutenberg's evenings were henceforth occupied in constructing a frame to inclose the type, and a printing press; but it was some two years from the time of the disbanding of the firm before he was ready to print. He then issued an alphabetical table, called the "Absies." This was a one page book, and had besides the alphabet, an Address to the Virgin Mary, and the Lord's Prayer. He had designed it for the use of the pupils in the Cathedral school, but it was some time before he had courage to attempt introducing it.

A little incident decided him. It happened one morning that Peter Schoeffer, a scholar who had assisted in selling the block books, and now famed for his skill in penmanship, came into the shop. He had at one period called often, and a friendship had sprung up between himself and the inventor. The latter, sure of his sympathy, showed him a copy of the "Absies." Schoeffer was highly pleased, and said, —

"According to my thinking, this is what we need in our school. The letters are regular and plain,

and it would save great labor in copying." He then volunteered to bring the work to the notice of his teacher; and after inquiry and examination the school was furnished with the "Absies."

Time passed, Gutenberg leading much the same life, — mostly engaged in the lapidary business, and printing a small page occasionally; in this last work having little patronage. It was, indeed, useless to attempt printing at Strasbourg; the old prejudice reviving as soon as it was known that he had made any new issues. He resolved, therefore, to abandon the place forever. But where should he go? As was natural, he decided to return to Mentz, the home of his childhood and youth. In this decision Anna fully concurred, sensible that her husband could never succeed in the place of his defeat.

Gutenberg was deeply moved on approaching his native city, Mentz. He had left it in the buoyancy of youth, a chevalier; less than a score of earnest, struggling, eventful years pass, and he returns an artisan. Humiliation, indigence, and glory had wrestled in his destiny. The lawsuit had spread his fame through Germany; but poor, ruined, condemned, he comes back with aching heart and disappointed hopes to reconstruct, if possible, his fallen fortunes. His parents were no more; and hesitatingly he drew near the old home, a stately ancestral

dwelling. How would his brother receive him and his in the day of his adversity? Would he find him estranged by the cruel slanders of the Strasbourg busybodies? He well knew that he should miss the loving ministrations of his sister Hebele, as, soon after his departure, she had joined the St. Claire Convent; and now he realized as never before, her living burial. Alas! she seemed dead to her friends. Forebodingly he crossed the threshold of his fathers; but Friele, true brother that he was, met him joyfully, bidding him welcome again and again. This sympathy was most grateful to the wanderer in his reverses; still he was only half-satisfied, he so much longed for help in his beloved art; but how could he speak of it, and perchance break the spell of their happy meeting? Friele had, however, learned many passages of his late history from Gutenberg's occasional letters to his mother, and eagerly questioned him for farther particulars. This led the inventor to dwell on his struggles to bring out an art which would multiply books, and lessen the labor of making them. Friele listened intently, yet was doubtful of new things. He promised, however, to aid him in some feasible way. This might be the work of time, and meanwhile he begged him to be hopeful and happy, expressing his conviction that all would yet turn out for the best. This loving reception was balm to

the wounded spirit of the inventor; and feeling that he could safely confide in his brother, he showed him some of the works he had printed, and the printing materials which he had brought with him, at the same time acknowledging more fully his strong wish of commencing the business in Mentz.

Friele was increasingly interested, and hoped to be able to assist him; meanwhile Gutenberg decided to rent a small cottage, and pursue his business of the lapidary; occupying himself as he might be able, in fitting up his printing apparatus.

One day, some time after, as he was passing the Church of St. Christopher, he met his brother Friele in earnest discourse with a stranger, whom he introduced as John Faust, saying to Gutenberg, smilingly, —

"We were just speaking of thee, brother John!"

"I am most happy to meet thee!" said Faust, cordially. "I should know you from your resemblance to your father. I am well-acquainted with your cousins and all your kindred; I esteem them highly, and heartily welcome back a former townsman, — a member of one of our patrician families."

Friele pleasantly bowed and passed on, as Faust continued: —

"Your brother has given me some account of your efforts in the arts; and I am desirous of learning more respecting them."

The heart of Gutenberg was touched by the genuine interest in himself and his endeavors, manifested by the rich goldsmith; and the two new friends were soon walking the streets absorbed in conversation.

"I have devised a most important invention," said Gutenberg, "and it remains hidden like a buried seed till the rain and sunshine bring it up to light and fruitage. Would that I had my hoarded patrimony, that I might render my discovery available! But such is the necessity of keeping the details of my processes, that I have not ventured to apply for money to prosecute the art."

"If I had a full understanding of what it is, I might perhaps assist thee," returned the banker.

"It concerns book-making," explained Gutenberg, for Faust was fast winning his confidence. "You are aware that the great work of the monasteries in Germany, as elsewhere, is copying books, and that they receive vast sums for their works. My new process doth entirely supercede their toil, and fashioneth books without the labor of copying."

"Impossible!" ejaculated Faust.

"But I can demonstrate it!"

"Good, if thou canst prove it beyond all question. But what money is needed to carry out thy wonderful discovery?"

"Some two or three thousand florins," answered Gutenberg.

"If I were convinced," returned the other, "that it would pay better than goldsmithing, — but I must see specimens of thy work, before committing myself to the enterprise."

"And I will with pleasure show them you, provided you will pledge yourself that, if convinced, you will invest in the undertaking. Meanwhile rest assured that it will yet pay richly. Why, consider what moneys the monks receive; and my books will be more in demand, since they are better executed."

"As to books," remarked the goldsmith, "according to my thinking there are enough in the world already. They serve little purpose save to turn active men into mopers. Nevertheless, as people will have them, there can be no harm that we should make a profit by furnishing them. They may as well have books as jewelry and mirrors, which gratify their vanity."

"I think so," replied the inventor, smiling; "and when you come to know my art, you cannot fail to admire it."

"Art!" exclaimed Faust jocosely, "hath it aught to do with the black art? I could not abide that. Much as I value money, I would not league myself with the Evil One."

"By no means," said Gutenberg, a mirthful expression breaking over his care-worn face, "and you have no greater abhorrence of such wickedness than myself." Then seriously, "I believe in using the wisdom that God giveth. As saith St. James, 'If any man lack wisdom, let him ask of God, who giveth unto all men liberally, and upbraideth not.'"

"But what if thou art deceived in thy business calculations? What then will become of my money?" asked Faust.

"There can be no mistake," was the answer. "I have put the discovery to practical use; I have made books by it, and there can be no illusion. This I will demonstrate before we sign a contract. If it were not a great discovery, and most beneficent and far-reaching in its results, I would not be thus earnest to bring it out. But to delay is risking too much; in case of my death, it would perish with me."

"If I can be convinced that it is a certainty," returned Faust, "I will furnish capital; but I cannot abide a doubt. As I said, if I am satisfied, we will draw up and sign an agreement; you, on your part, to teach me the secrets of the art; I, on my part, to provide money; and the profits to be shared equally."

He then agreed to come and spend the ensuing day at Gutenberg's house, examining specimens of

his work and investigating the practicability of his invention.

It was noon the next day when Gutenberg took Faust home with him, to the dismay of Anna, who, since her preoccupied husband had forgotten the marketing, had only the prospect of a dinner of herbs for her guest. At length, in her anxiety, she heard the sound of a fisherman's horn; and, sallying out into the street, she purchased a great treasure, — a fish. In due time the simple repast was ready; and when they were seated at the table, Faust, reverting to the subject of their previous conference, said, —

"Your invention has something to do with engraving on wood. How can that be less laborious than copying?"

"It is precisely to draw your attention to that point that I spoke of it," replied Gutenberg. "With that alone we could not even imprint a large work in a life-time. But if, instead of engraving a whole page on a solid block, we use a small movable block for engraving each letter, you see that we can then use the same letters any number of times, and so lessen our labors beyond all calculation. This is the first great step of my invention. Does it not seem simple? Why did no one think of it before?"

He then described the process by which he

reached his various improvements, dwelling especially on his invention of the press.

"You must have a world of perseverance!" observed Faust, admiringly.

"When one gets on the track of a great idea," said Gutenberg, a handsome glow tinging his cheeks, "it is hard to give it up."

"But you are an artist in gems," interrupted Faust. "Who executed the work in wood for you?"

"Conrad Sachspach, at Strasbourg, made the frame, following my directions. But I must show you some of my books;" and, rising, he produced a number, and among them the "Speculum," which was made partly from blocks and partly from movable type.

"Are these really specimens of books, Master Gutenberg?" asked Faust with surprise. "Wonderful! wonderful! thou hast wisely devised a most useful art, that will shortly bring thee both riches and renown!"

"And thou hast the faculty to quickly comprehend my art," replied Gutenberg with a beaming face.

"That is true," added Anna, "and it is so blessed to be appreciated. But while you warm over your theme, dinner gets cold!" and a laugh went round the table.

"This is a worthy deed of thine, madam," replied Faust, "preparing a good dinner, and making us laugh. Physicians would commend thee."

"What would they say to my husband? wouldn't they counsel him to descend from the clouds and eat like other people?"

"No doubt of it, madam, since ideas, however original, have not the nourishing elements of food. You have been tried by your husband's application to his one idea?"

"At times," replied Anna, "I have failed to see the service of it." Faust laughed heartily, adding, —

"Time enough for the utility, madam. The invention must go through a process to become available; it must creep before it can walk. Have patience, madam!"

"I try to have a great store," she playfully said, "but he is so taken up with his projects that I can scarcely ever get a word from him. When he leaves his work-shop for the day, and draws his chair to the fire, one would think he might have the grace to be sociable; but there he sits and pokes the fire, reads the fire, studies the fire, half the night, and I would like to know what is the necessity of so much meditation?"

"Ah, madam," returned Faust, "it is the common experience of inventors to meet many adversi-

ties in the outset. You have reason to be proud of your husband. As I understand it, he has made a great discovery, — the beginning of something of vast importance."

Then, turning to Gutenburg, he added, "I am ready to advance thy invention. But how shall we move? Secrecy is indispensable. We must live in the same house in which we work, — we must consult much together. Where is there a suitable building?"

"I had thought of the Zum Jungen," said Gutenberg.

"The very place. It is almost a palace in size, and will afford ample room; is in the city, and yet retired from its bustle. It is now vacant, and I will go and engage it at once. This evening let us draw up a written contract, or articles of agreement, and I will advance the needed funds. When can you remove?"

"To-morrow, can we not, Anna?"

"Why," exclaimed she, "can we get ready so soon? We are scarcely settled yet."

"The easier to remove," replied Gutenberg; adding, "moreover, the Zum Jungen is a very beautiful place, and reminds me of the old castle Thür, where I first met my Anna!"

"Let us go at once," immediately returned the wife; "it must be delightful. Why cannot De

Becktoff de Hanau come and help us remove?" alluding to an old servant and valet of the Gutenberg family, who, like others of their servants, had been allowed to hire himself out, since he could not be maintained.

"A good thought, wife; he shall take charge of our goods, and we shall avoid some of the fatigue of a second removal. I will bring him hither;" and Faust having taken leave, Gutenberg hastened to find the old valet.

XIII.

The Zum Jungen. — The Old Valet. — A Happy Change. — Going over the Process anew. — Type of Lead. — Peter Schoeffer.

THE Zum Jungen, that famous old house on the Rhine, was engaged; the articles of agreement duly drawn up and signed. Faust advanced 2,020 florins, taking a mortgage of Gutenberg's printing materials as security; and the firm, having removed their families to the building, commenced operations in the printing rooms. Hanau, the valet of the elder Gutenberg, was especially serviceable in the removal, and was soon installed as a faithful helper in the office.

"What think you of this?" said Gutenberg to Anna one morning, soon after the settlement in their new quarters, as they stood on the balcony that overlooked the river.

"O, it is so beautiful!" she replied. "Never will I tire of this scenery. There; do you see those swallows sitting so still upon their nests under

the roofs? Now one flies off zigzag to the ground, after a worm; now she bears it back, perches upon her nest, and chippers with her little ones as they eat their breakfast. Hear them chatter! Then how fragrant the flowers! How pretty the hills, clad in vineyards! I feel at home already, and I mean to be happy, and let no forboding trouble me. I do not yet ride in a coach, and dine like a queen, but my home is in a palace. How good it was in Faust to advance money! What a difference it makes in our circumstances!"

"Besides, how it affects my art!" returned Gutenberg. "How could I prosper without it? And, Anna, we do well to remember that there has been providential interposition in our affairs. We must acknowledge it if we would be directed. Think of the long trial we have had, and of our deliverer."

"It does seem like a miracle. But how canst thou ever make new types and presses like those which were destroyed at Strasbourg?"

"Trust me I shall not be long of doing that," answered Gutenberg. "I am encouraged. The prospect was dark until my arrangement with Faust; but we shall do well enough, now that abundant means are provided."

At first the firm was occupied with some of the block books which had been issued at Strasbourg. Among these were the "Absies," or alphabetical

tables, the "Doctrinale," and a manual of grammar, or "Donatus."

The work did indeed go prosperously forward. Gutenberg, Faust, Hanau, and Martin Duttlinger, — the last named a Cathedral scholar who had assisted in printing at Dritzhn's shop, — were occupied from early in the morning till late at night in cutting type and setting it up. Faust had also occasionally some of his workmen — a Hamburgher among them — in the printing hall. They wrought in two well-lighted, convenient rooms in the second story, — so surrounded by other rooms as not to be accessible to strangers, — which apartments they kept constantly locked.

Step by step, the company went through in a few months what caused Gutenberg years of experimenting, as we in a few hours can read a book which cost the author the study of a life. Not that they really mastered everything as did their teacher. That which he himself elaborated, was indeed a part of his mind, his inventions being his thoughts embodied. Hence the propriety of giving him so prominent a place in this volume. The art cannot be fittingly portrayed without sketching its originator. Like soul and body, they belong together; it is impossible to picture one without the other.

To describe the process by which Gutenberg

taught his art, would be to repeat the progress of the Strasbourg firm, save that the Mentz printers were more hopeful, earnest, and intelligent, and did not so easily yield to obstacles; and also the difference that they were immediately advanced to movable type.

"We are making fine headway," said Faust to Gutenberg, when the works referred to had been printed.

"Yes, but we sadly need a designer for our engravings. How I miss my Andreas Dritzhn, of happy memory, who did excellent service in this line at Strasbourg."

"Cannot some one be found to fill his place?"

"I know of only one man that would do," replied Gutenberg, "and that is young Peter Schoeffer, a teacher of penmanship, now residing in Paris. I must send him word to join us."

As the printing went on, Gutenberg encountered the old difficulty of the softening of the type, and, on being questioned by Faust respecting it, set his ingenious mind to work to remedy it.

Turning to a drawer of odds and ends, and taking out some bits of metal, he said, "Suppose we make our type of lead!" Faust took up a strip, and, commencing a rude letter on the end of it, said, "This will do, assuredly. It is hard, and yet we can cut it, and it will not become soft, as does wood, by absorbing ink."

"We can at least test it," said Gutenberg. "If it should not prove to be just what we need, it may suggest something useful. My progress has been made by a series of experiments; and because we fail once, is no reason for discouragement. We have only to try until we succeed."

Faust's letter gave him much satisfaction. "We have discovered the right thing for our type!" said he, after making an impression with it. He then strode up and down the room, now looking at this form, now that, then stopping to dab the leather ink-balls on the type, then taking up a manuscript, and generally making himself at home in the printing-office. Since he had become a partner and patron, his manner had grown pompous and somewhat lordly. Although a mere novice in the new art, he was fully sensible of the honor he conferred on the firm in associating himself with it, and very naturally assumed a general oversight. The inventor saw the infirmities of his friend, but forebore remark. He was both discerning and patient.

One afternoon, some weeks later, as a shower was rising, Anna sat by her window, alternately sewing and watching the clouds as they gathered in dark columns and overspread the sky. The brown sparrows that frequented the roof of the Zum Jungen, chattered as the large drops fell, perching upon

the tiles and laughing at the rain. Just then who should be coming up the street but Gutenberg and Peter Schoeffer, in earnest discourse, seeming to heed the weather as little as did the birds. Gutenberg had opened his heart to Schoeffer as to an old friend; he felt confidence in doing so, for Schoeffer had proved himself estimable and trusty when in his employ at Strasbourg. As they came nearer and entered the house, Anna heard Gutenberg say, "Canst thou tell me, Master Schoeffer, now that we are on my art, what is the most notable and important book in the world?"

"I do not consider myself learned enough to answer that question," answered Schoeffer, after a pause. "The scribes who spend their lives in making libraries should know."

"That is true," was the reply. "But, judging from the works which you have seen, which is the most celebrated and useful?"

"I recollect," replied Peter Schoeffer, "when I was in the Cathedral school, that Father Melchoir showed us the Gothic Gospels, or Silver Book, and remarked that more art and expense had been spent on the Bible than on any other book. From this I must infer that in the opinion of the wise, it is the most useful and important book in existence."

"Right," replied the inventor; "more time

has been spent in copying the Bible than any other book, and justly; for the Word of God is before all human productions."

"But is not the Breviary made more prominent by our priests?"

"Although in more common use, you will notice that it is not generally so highly ornamented and so costly as the Bible. This last is the foundation of the Prayer-book, as also of the institutions of our religion. Whatever we enjoy of Christianity and civilization is due to that sacred Book. Hence it is of all others the most to be prized and preserved. There are, however, comparatively few copies of it in the world, — only two or three thousand, it is said, and these mostly hoarded in monasteries, universities, and royal libraries. Suppose now, that in the conflict of nations, evil should befall the depositories of the sacred Book, and, through some devastation or edict, the Bible be lost to us. Moreover, the Holy Book is sold to kings when they can afford to pay six hundred crowns for it; if *they* may have the Bible, why may not their subjects? My purpose is to print a Bible in the best style of my art, and multiply copies of it. I shall need in this work a skillful engraver of letters."

"But what an undertaking, to print the entire Bible!" said Schoeffer.

"Yea, a stupendous work!" was the answer,

"and it will take years to accomplish it; hence I am the more anxious to begin. Can I not depend on thy aid?"

Peter Schoeffer had assisted Gutenberg in Strasbourg, and admired him, and now was only too happy to accede to his request, and take charge of designing letters for engraving.

Thus early in the history of his invention did Gutenberg conceive the project of printing the Bible; consecrating his art to the honor of God, and the welfare of his fellow-men. Well does Mr. Hallam say, "It is a very striking circumstance, that the high-minded inventors of this great art tried at the outset so bold a flight as the printing an entire Bible."

XIV.

Working of the Press. — The Medallion. — An Acquisition. — Experiments. — A Failure. — Schoeffer's Invention. — Discovery of Cast Metal Type.

ENTERING the printing rooms, Gutenberg introduced Peter Schoeffer to John Faust, and then called his attention to the new press, which was a noticeable improvement on those broken up at Strasbourg.

"Admirable!" exclaimed Schoeffer, as the inventor explained the working of the machine. "Good progress has been made since I was in your shop, years ago."

As Martin Duttlinger, the workman, dabbed the type with ink, slid under the platen, and, having pressed it, removed the printed page, Peter was delighted with the facility with which the press operated.

"This is truly wonderful," cried he. "Pray, friend Martin, how many impressions can be made by this press in a day?"

"About three hundred, if we work it constantly."

"Is it possible!" exclaimed Peter. "Now indeed will books multiply. What will the plodding copyists say to this?"

Simple man of the ancient time! What would you say to the speed of our cylinder presses, which throw off twenty thousand printed sheets an hour, or more than three hundred a minute! Think of it, shade of Peter Schoeffer, — it would take one hundred and ninety-two thousand of the swiftest scribes to furnish by copying the same amount as one of these presses supplies in one hour!

Contrast the speed of the snail and the lightning!

But what was Peter Schoeffer's personal appearance? some one asks. We shall let you judge for yourself, — in our opinion he was not handsome. However, as "handsome is that handsome does," if we can find in history that he did to others as he would have others do to him, we will forgive his plain face, since it was no fault of his. Suppose also we look at the three together.

The portraits are taken from a medallion, and are faithful likenesses of the individuals acknowledged in Germany as the first printers. The subject from which the picture was copied, is said to have been engraved by the famous Gubitz of Berlin, from an old German painting.

We shall become more interested in Schoeffer when we learn what he achieved; but it is high time he was described.

His forehead is high, hair scanty and smooth, the perceptive ridge stands out over the eyes, — which are black and piercing, — nose long and decided, mouth large and smiling, and the chin entirely hidden by a flowing beard. He is called the *Improver* of the art of printing.

Faust, on the same medallion, is a better-looking man than Schoeffer, and twenty years his senior. His brow is not so lofty, but it is care-worn, while his hair is jet-black. He has the hawk's eye, keen nose, and pursy mouth of the shrewd and thrifty business man. A scanty beard discloses a well-turned chin, and altogether he makes a fine appearance. He is distinguished as the *Promoter* of the art.

Gutenberg has been already described in a preceding chapter.

To return to Schoeffer.

Opening his travelling bundle, he produced specimens of his own hand-writing. These were in the most elegant style of the practiced monks. The letters were clear, legible, and uniform, charming the eye.

"Your nice taste and delicate execution, my son," said the inventor, "will nobly aid the art of printing.

(From an old painting.)

Abide with us, devote your talents to the art, and you shall not be the loser."

"You do me too much honor," replied Peter. "I shall only be too happy to serve thee in my former capacity. I feel that I have everything to learn in this invention, which has made such advancement in my absence."

Gutenberg was by no means a good penman, neither could he cut very legible letters in type.

But what Gutenberg lacked, Peter Schoeffer could supply, and the type which was made after he joined the firm, showed the benefit of his coöperation.

As the wooden type had in a measure failed, from the necessity of frequent renewal, the company gradually substituted letters of lead. John Faust and Schoeffer entered with much interest upon the experiment of using lead, sanguine of its success. They still confined themselves to printing the elementary books. They found no difficulty in cutting the letters with precision, and they could put them together as well as those of wood; they had trouble, however, in printing with them. The metal was so soft that it required the nicest skill in turning the screw, as it would scarcely bear sufficient pressure to print.

See Gutenberg, Faust, and Schoeffer, and the different members of the firm, around the press in al-

most breathless suspense at the trial of the leaden type!

"This will never do," exclaimed Faust in dismay, as the proof-sheet was drawn out, after Gutenberg had turned the screw. Some of the type were so much bent as to spoil the letters; others did not print at all. The experiment was a failure.

"Patience!" cried the inventor, "we shall yet succeed. Turn you to your type-setting, and let me manage the press;" and thus he spent the remainder of the day. Working it by himself, he found that if the screw was turned to a given point, it would, under his hand, print without injuring the type; but when another took his place, it was sure to be marred.

The artisans were much depressed when they separated for the night. Gutenberg invited Schoeffer home to supper, that he might talk over the matter.

"The lead type is plainly too soft," remarked Gutenberg as they sat by the cheerful fire in his own room in the Zum Jungen. "What we want is softness and strength, a mixture of qualities. Another metal should be added."

"Have you tried iron?" asked Peter.

"Aye, some time since," was the answer; "but it pierced the paper so that it could not be used."

Each then suggested and discussed different com-

binations of metals, and decided to try experiments until the right alloy was found. And thus the evening wore away.

One suggestive intellect stirs another. As the flint elicits the spark from the steel, so two minds may jointly originate a new thought. Under Gutenberg's influence the workings of Peter Schoeffer's active brain took shape, and all the inventive faculty within him was brought into exercise.

Now it so happened, as Nieritz relates, that Peter was accustomed to experiment in metals, and the very next day, after sweating over the fire in the back office, brought in an amalgam which he thought might answer the purpose. It was a mixture of regulus of antimony and lead. This proved to be of the requisite softness and strength.

The day of this discovery was an eventful one. It was Schoeffer's first invention. Faust called Gutenberg aside when he saw how well the new material worked, to congratulate him.

"Good teachers produce apt scholars," said he, patronizingly patting Gutenberg's shoulder. "I must wish thee joy of thy apprentice. He takes to the art like a kitten to milk. We must make him one of the firm."

"He is an ingenious workman," returned Gutenberg, "and we need all the ability of this kind that

we can command, for difficulties often occur. I also am in favor of making him a partner."

"Moreover, it is so pleasant to have another with us whom we can trust," added Faust, "and an old acquaintance of yours. I am suspicious of strangers. Our success depends mainly on keeping our secret."

Happily Schoeffer did not hear all the praise lavished upon him, but he heard enough to incite him to diligence and perseverance. Gutenberg was justly proud of him, and grateful to the kind Providence that had sent him to the Zum Jungen.

XV.

Schoeffer admitted to the Firm. — A Grand Project. — How a Bible was borrowed. — The Early Press. — Processes in Bookmaking. — Ingenuity of Peter Schoeffer. — Industry of the Firm. — Ink. — Cast Type. — Three Ingenious Men. — Letter-founding. — Faust compliments Peter. — The First Printed Page of the Bible. — A Memorable Year.

WE now view the first printing firm industriously cutting type from the metal introduced by Peter Schoeffer, who is one of the partners. Gutenberg, having fully tested it, found with joy that it was the long-sought composition. It was hard enough to bear the necessary pressure, and yet did not perforate the paper or vellum in printing.

"This is most opportune to our need," said he to Peter; "we can now begin to set type for the Bible. The lead *stucke* must be melted into the new mixture; you shall have charge of it, taking care to reserve some of the best letters for models. We must keep in mind that the care with which the letters are carved will determine the appear-

ance of the book. By lavishing time, ingenuity, and money on the Bible, the monks have produced some elaborate specimens. I see no reason why we may not rival them if we try."

"Of all books the Bible should be in the highest style of our art," remarked Schoeffer.

"True, it should be," replied Gutenberg; "and as you have cultivated yourself in penmanship, I wish you to instruct the firm in type-cutting. I have thought of a plan by which we can have uniform and elegant letters. It is that you write them on the ends of the metal strips, and let others carve the type from your pattern. This will insure us one style of handwriting throughout the Bible; ever keeping in mind that it is our aim to produce the most beautiful book the world has ever seen, — for it is fitting that this book, of all others, should be issued in the most excellent manner."

"But," observed Peter, "how can we excel the monks, when one man spends a life-time on writing out and embellishing a Bible, and we can only devote a few years to it? For instance, how can we ever bring our Bible to compare with the Silver Book in the care of Father Melchoir, the letters of which are mostly of silver, and the illustrations of gold? I had access to the Royal Library of France, in the Louvre. There I saw a copy of the Evangelists, written in liquid gold! I fear we shall

fail in magnificence, and give as great a contrast compared with these monks, as our plain printing-rooms form with that library, the floor of which is paved with marble, the walls decorated with glass and ivory, and the shelves and desks are of the costliest wood."

"I shall not attempt to rival the monks in adorning my Bibles with gold and silver," said Gutenberg; "if the letters are faultless, and the printing clear, we shall outvie them, and I am persuaded that we can effect this. It would be idle for us to print with gold, even if we had the abundance to warrant it. The monks are wealthy, and only lavish it on a single copy, once in many years; while if we issue one Bible, we shall imprint more than a hundred!"

"Aye, indeed!" exclaimed Peter Schoeffer, "What a magnificent thought! Truly we live in a wonderful age, when six men can make a hundred Bibles in six years!"

(But what would you say, Peter, could you witness the lightning-feats of the steam-presses of this day, dashing off a thousand copies of the sacred volume in one day?)

"And moreover," replied Gutenberg, "when we have disposed of one hundred copies, we can issue as many more in a shorter time."

"That is most cheering," returned Schoeffer,

" and I will at once engage in my department of the work."

The printing of the Bible was now the great enterprise of the firm, smaller works being issued by way of preparation. While Peter Schoeffer superintended type-cutting, and the office work went on as usual, there were long and earnest consultations as to the best course to pursue in obtaining a Bible for a copy. If Gutenberg or Faust bargained for one with the Abbot of a monastery, inquiries would be made which they wished not to answer.

"If I had the money to deposit for a Bible," said Martin Duttlinger, "I could easily obtain one."

"And the money we expect to furnish, of course," said Faust. "No one can borrow so valuable a piece of property as a Bible, without the same as buying it."

It was accordingly arranged that Martin Duttlinger, who was the most trusty of their workmen, should be charged with the mission of buying a Bible of Trithemius, Abbot of Spanheim, who was known to have books for sale; and Martin was accordingly fitted off. After his departure, affairs went on with the firm much as usual, save that they felt the impulse which the resolve of engaging in the noblest enterprise on earth could not fail to give; and who can doubt that the smile of God's countenance rested on them, lightening their toil?

ANCIENT PRESS.

Gutenberg and Faust advised much together respecting the improved printing machine they were adjusting, and Schoeffer made rapid improvement in his particular branch of the art.

Gutenberg's press was very simple in construction, — a board acted on by a screw, like a cheese-press. On this board the type was placed inclosed in a frame, then inked; the paper was then laid over them, and the screw turned by a lever with the hand. In constructing this press, he had two upright posts of great strength, seven feet and a half high, placed four feet apart, and fastened together at the top and bottom by two stout cross-pieces. In this frame an iron screw was made to work, by means of two parallel additional cross-pieces, about a foot and a half apart, connecting the perpendicular posts. From about the middle of each of these upright posts, three feet from the floor, a slide projected, called a rib; these posts were parallel to each other, and firmly fitted, to bear a great weight. But these two points of the press, — the *screw* and the *slide*, — let us see of what use they were. A table was made to run in under the frame and out, the slide supporting it in place of legs. The screw worked in a box, called a hose, by means of a bar or lever inserted in it; the toe, or lower end of the screw, working in a sort of cup fixed upon a large block of dense wood,

having the face planed smooth, and called the platen. By turning down the bar, the screw forced down the platen, which was fastened to it, just as far as it descended; when the screw was raised, the platen was also raised.

The frame or chase which contained the type being fixed upon the table, it was made to slide backwards and forwards as was needed. For example, when the type was ready to be pressed, having been previously inked, and the paper laid upon it, the workman slid it under the platen; and after the screw was turned down, and the platen had pressed it, or the printing was done, he slid it out.

The inking balls were constructed of a variety of things, and at length the printers used those which were made of sheep's felt.

A sheet of paper being placed upon the type, the form was slid directly under the platen; and this being pressed down by a handle turning the screw, the paper was printed.

This press served very well then, and even almost to our own day; a similar one is sometimes to be seen now, where common rough printing is required.

The press-work, being very toilsome, was done by turns, one man plying it a certain number of hours, then another taking his place. The Alphabet, with the "Lord's Prayer," the "Address to the Virgin

Mary," a "Dictionary," and a "Donatus," were the first works printed with the improved press, and separate types.

Each of these first printers was eminently practical. Had they been otherwise, never could so great a work have been executed. It is now necessary to employ as many as twelve trades to publish a Bible. These are type-founders, printers' joiners, iron-founders, paper-makers, wholesale stationers, letter-press printers, printing-ink makers, composition-roller makers, engravers on wood, lithographic printers, hot-pressers, and book-binders. But those three men, of whom Gutenberg was chief, wrought at most of these branches of business with their own hands, or by the workmen whom they taught, in the printing rooms of the Zum Jungen.

Schoeffer had great skill and facility in getting out the cut type, as well as in directing others to work after his models. When he had wrought at it some time and prepared a quantity of type, Gutenberg said to him, —

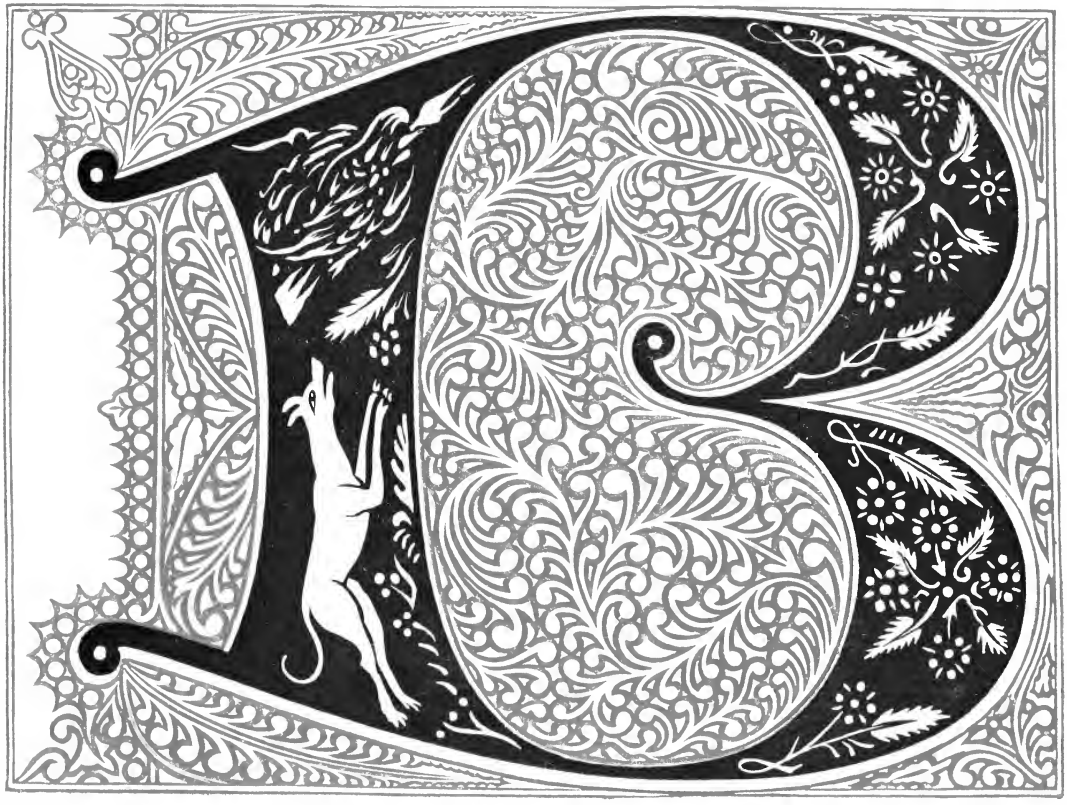
"Our initial letters must be illuminated, and as you have had much practice in this department of writing, being an illuminator of manuscript works, I doubt not you will execute them as they should be."

"I will do my best," replied Schoeffer, pleasantly. The result was that in a short time he had de-

signed and cut a number of illuminated letters, to be used at the beginning of chapters. As a specimen of his handiwork, we give the initial B, taken from a work of the Mentz press, and described on the following page.

Let us carefully notice this exquisite letter. On the left hand are elaborated fern leaves and other foliage; while the centre is dense with climbing luxuriance. On the right, in the broad curves of the initial, are delicate flowers suggestive of snow crystals, cerastium, and mignonnette, — dainty bits of infloresence just fitted to alight with feathery footfall on the back of the elephantine letter. On the other side is a bird taking its flight, and a dog pursuing. The letter itself originally was in pale blue, the ornaments in which it was placed being red; the figures and flowers were transparent and white, as well as the vellum on which the book was printed; showing that the art of engraving was no longer in its infancy, and also that the artist was well practiced in his profession.

Well done, Peter Schoeffer! we cannot sufficiently admire thy taste, patience, and perseverance. What an infinite deal of labor and pains it cost thee to design and engrave hundreds of these illuminated letters for the Bible! Besides, there was the general superintendence of type-cutting; for every letter was drafted by the same hand. We



FROM THE PSALTER, PSALM I.

are puzzled to think where you acquired your skill. It is said that you were famously started under the fostering care of Father Melchoir, himself a good copyist, and then improved your style by two years' application at the University of Paris. And all this that the Bible may be fittingly printed! Little did you think when a student at the Cathedral of Strasbourg, for what you were studying. Neither did it occur to you while your eye was schooled for the conception, and your hand for the execution of beauty, at Paris, for what you were preparing.

In due time Martin returned from his mission, bearing a Bible in manuscript, in a satchel on his back, and great were the rejoicings and congratulations of the firm and their families.

Gutenberg, Faust, and Schoeffer now became more and more absorbed in the various divisions of the art of printing, preparatory to setting the Bible in type in the best style.

The simple branch of inventing and making ink, for example, cost time and patience; many experiments being tried before the right combination was found. Common writing ink would not answer, being so liquid as to deface the paper with blots. Finally, a mixture of linseed oil and lamp-black or soot was tried, and found to possess the right consistence. They succeeded so well in compounding it that, as one has said, "their works show a depth

and richness of color which excites the envy of the moderns; nor has it turned brown, or rendered the surrounding paper in the least degree dingy." It was applied to the type by dabbers. These were balls of skin stuffed with wool, precisely like those used forty years ago. The types were disposed in cases much as they are now.

The firm was getting on finely, having prepared several hundred pounds' weight of type for the Bible, when Schoeffer, getting weary of this monotonous cutting, "and being ardently desirous to improve the art," bethought him of trying to invent a simpler and speedier method of preparing type.

It is interesting to follow this scribe, belonging to an ancient and honorable craft, as he helped pull it down to build up one infinitely better. It was like taking down a cottage from a goodly site, to make room for a Crystal Palace that would last through all time. Not that Schoeffer was alone in this enterprise; he simply aided others. He may have suggested the new device of casting type, and indeed some go as far as to give him the entire credit of the conception and execution of this process. He had taste, culture, and adaptation to circumstances; Gutenberg was ingenious, and Faust wealthy; and there was every motive to arouse Schoeffer's mind to activity. Says a discriminating English writer, "It seems most probable that where

three ingenious men are bound together by art and interest, no one of them can lay exclusive claim to any invention or undertaking executed in the workshops and for mutual benefit. Allowing, therefore, to Schoeffer the honor of having hinted the plan, the other two may fairly put in a claim for their portion of the credit on the score of their assistance, especially since Gutenberg and Faust, being mechanics, would have engaged and directed the workmen."

Evidently at the suggestion of Schoeffer, the firm began to take casts of type in moulds of plaster. This improvement on the old method was really a great step onward, although the process of casting was slow and tedious. A new mould was required for each letter; and let the workman be ever so vigilant, no care could enable him to impress fully and steadily into a soft substance so small a thing as a type is at the face, while yet so long in the shank; accordingly, when he succeeded well in his attempt, after the casting, there was a process of finishing, to give it the well-defined sharpness absolutely necessary in type. This improvement therefore was rather unsatisfactory, and led to much consultation of the printers how they could carry it still further. And here Peter Schoeffer's practical talent appeared; for "it was he who first planned the cutting of punches, whereby not only might the

most beautiful form of type the taste and skill of the artist could suggest, be fairly stamped upon the matrix, but a degree of finish quite unattainable in type cut in metal or wood could be given to the face; whilst to the shank, by the very same process by which the face was cast, the mould would give perfect sharpness and precision of angle."

History relates that Peter Schoeffer privately cut matrices for the whole alphabet, and showed the letters cast from them to Gutenberg and Faust.

"Are these letters cast in moulds?" asked the latter, in great astonishment.

"They are," replied Schoeffer.

"Mirabile! this surpasses all!" exclaimed he. "Why, you are showing yourself a great genius, I must acknowledge. How old are you?"

"Twenty-eight!" replied Peter.

"I seldom flatter, but you are a young man of promise; and I predict that you will make your mark in the world! I suppose you think that is slight praise, for a practiced scribe ought to be able to write his name in gold letters, — making his mark is said of those who can only make a mark for their name;" and Faust laughed at his own wit. "But you know what I mean. In my opinion, you will yet come to distinction!"

But how shall we describe the emotions of those first printers, those cool yet enthusiastic men, as they

beheld the first printed page of the Bible! The press worked admirably; the type was uniform and elegant; and the expression given on the vellum, unequaled in beauty. At sight of it a glow of honest pride filled each heart; and how could the most undevout repress emotions of praise to God?

We have a glimpse of the little company in the frontispiece, taken from an old painting. This was in the spring of 1450, a year memorable as commencing the issue of the famous Mazarine Bible. But with all the toil and diligence bestowed upon it, it was not completed until five years after, in 1455.

XVI.

Faust's Discontent. — Conspiracy against Gutenberg. — A Secret kept. — The Lawsuit. — Gutenberg supplanted. — A New Firm. — Gutenberg's Sorrow.

IT was now in the early part of October, 1455; and of late, Faust, to whom history gives the title of Doctor, had become dissatisfied with Gutenberg, on the ground that returns did not come in fast enough for the money invested. The Bible had been issued, it is true; but as it had been at great expense, and its sale was small, his enthusiasm in regard to it declined; and although once so warm a friend and patron of Gutenberg, he grew cold-hearted and scheming. He was, however, increasingly cordial to Peter Schoeffer, and one day invited him to supper. Flattered by the attention, Peter appeared promptly at the rooms of the Doctor, his toilet made with unusual care. It was in the early evening, and a fire was being kindled in the large room into which Peter was ushered. Madam Faust, an invalid, sat in her arm-chair wrapped in a

shawl, to shield her from the chilliness, as a driving rain was pelting without. Christiane, the daughter, a young lady of twenty-five, — and Peter thought he never saw her look more beautiful, — cordially greeted him, and placed a seat for him.

"Good-evening, master!" said Faust urbanely, rising and shaking his hand. "Sit nearer the fire, master; the room will be warm soon."

In the course of the conversation which followed, Faust said, "Gutenberg gaineth little in inventing. According to my thinking, he cannot be named the same day with yourself, Peter. You devised the ink, the forms for casting type, and the mixture of metals; and these are nearly all that has been invented. I regret to say it, but it would be a good thing for the firm if Gutenberg would even retire, so great is his extravagance. Why, he expended 4,000 florins before the Bible was half done! How he can ever pay me for the sums I let him have, I do not comprehend."

"Economy is certainly useful," observed Peter in a general way.

"A just and sensible remark," replied Faust. "Your printer's ink shows that you mean what you say; it is admirable, it is so cheap."

"I am glad you think so, master," replied Peter, glancing with a proud flush at Christiane.

"I often say to my wife and daughter," contin-

ued Faust, "that if justice were done, you would be the acknowledged inventor, since you are continually making improvements, while he invents nothing, so to speak. Moreover, he is extravagant, and the business will be ridden to death with debt."

Peter was more than gratified that his efforts were appreciated by the Doctor; but he revered Gutenberg, and was shocked at the proposal to eject him from the business, and he ventured to say, —

"I owe much to Master Gutenberg."

"True," replied Faust; "but if you were not dependent, you would acquire more in one week by your unfailing genius than he could impart in a year. The faculty to contrive and discover is in you; and if we were once rid of him, a great revenue would accrue. In due time you would be rich and renowned."

The fire burned briskly, throwing out a genial warmth; the watch-dog basked on his mat, opening and shutting his eyes in calm content; Madam Faust's delicate face became pink in the ruddy glow; Christiane's cheeks were abloom; the kettle sang from its long hook on the crane; a servant glided softly around as she laid the table. Peter fell into a dreamy abstraction.

"If I could even do it honorably," he murmured half unconsciously.

"Honorably! certainly thou canst," emphatically returned Faust. "Dost thou think I would counsel thee to do that which would be otherwise? Business is business, and one must look out first for one's self. Thou mayest have qualms of diffidence in severing the old tie, having served so faithfully under him; but we will be answerable for the change; we will see that he retires from the firm, and thou shalt not be blamed. Agreeing to this, I will insure thee the use of my money to the extent of my means."

"Wife, I hope you have something palatable for Master Schoeffer," said Faust, as all were seated by the table, and he helped his guest. Then, returning to the subject of their conversation, —

"Aye, leave me alone in disposing of this matter. I've a little case in law, which, for my brother's sake, I shall set afoot. Gutenberg is culpably careless of money. It is shocking to see one thus making shipwreck of conscience. Of the 2,020 florins which I lent him, he has not returned one obolus. He has not even paid the interest."

"He has not!" exclaimed Peter. "What can he be thinking of?"

"Of himself," replied Faust. "As long as he has money, what cares he who goes without? I can only do business in a business way; and I shall immediately call him to account; and, Master

Schoeffer, our firm shall be established on a firm basis."

Poor Peter was too well pleased with Faust's flatteries, and, yielding to the stronger will of his host, had listened to adroit insinuations against Gutenberg until his heart grew hard. The Doctor was quick at reading character, and knew how to turn Peter's interest in Christiane to account, and, when his guest rose to leave, said, —

"But, Master Schoeffer, you are by far too industrious. You are worn with work, and need relaxation. You ought at least to devote these magnificent moonlight evenings to recreation. My boat is always at your service, and here's Christiane — if you cannot find better company — give her an airing on our beautiful river."

Schoeffer had often raised his eyes from his work to glance at the lovely vision of Christiane, as she flitted by on her morning rambles; but, proud and retiring, had felt the pecuniary distance there was between her father and himself; and though he sometimes fancied she was not indifferent to his admiration, they had not until that evening spoken together. It seemed like a dream; for now in her presence her father had lavished attentions upon him, and predicted for him fame and fortune.

The next morning, Gutenberg, in order to urge on the work, early toiled at the press-work of the

Bible; for so slow and laborious was the process that comparatively few copies were completed.

"Good-morning, Peter," said he, unsuspicious of evil, as Schoeffer entered, and a workman took his place at the press. "You have not told me by what proportion of metals you have secured the requisite strength and softness of type."

"Excuse me, Master," replied Peter with half averted face, "let me keep that little secret. I may have to try again." Gutenberg was grieved by the answer as only a noble and sensitive mind can be by the slights of one who has been nourished like a child. He resumed his work, while the foreboding of the approaching storm fell on his spirit like a dark shadow.

Peter felt ill at ease; and a consciousness of the despicable part he was playing, at times brought the mantling blush of shame to his cheek; but he hardened himself against conviction, by magnifying his own improvements and dreaming of future greatness. Besides, he had really been prejudiced by Faust against Gutenberg, and his mind was much occupied with the image of the amiable and charming Christiane; and he feared to offend the father lest he might not win the daughter.

"When do you propose to pay me?" abruptly asked John Faust of Gutenberg some days later.

"Pay you!" ejaculated the other in great surprise, "I am not aware that I owe you anything!"

"Not aware of it!" angrily retorted the Doctor. "Not aware of the 2,020 florins and other large sums I lent you! I will give you thirty days in which to pay the debt; and if then you fail to do so, I shall take measures to collect it!"

"Hard conditions truly, even supposing I owed you! But the sums you mention were used for our common benefit, and we are in the midst of our first edition of the Bible. I have no way of raising money save from its sale, which it will take months to effect."

"That is not to the point," replied Faust. "I want the money, and the money I must have. My brother James advanced it."

"But how am I to procure it? Would you ruin me?"

"Am I to devise means for you to pay your debts to me?" was the heartless rejoinder. "The money I must have; and if you are an honest man, you will pay it: understand me!" and Faust abruptly left. As he had entered, Peter was missing, and did not soon return. Gutenberg had only Martin and Hanau with him, and was too much overcome to speak. Was it for this that he had climbed almost to the pinnacle of his hopes? Martin was full of sympathy, and even Hanau's vacillating heart was touched. Gutenberg saw that Faust and Schoeffer were leagued against him. The

barbed iron had pierced his roul. Press-work and proof-reading were not to be thought of. He sought his room in the lethargy of despair. The prospect that the printing of the glorious Bible would be arrested, the fear that his beloved art would be torn from him, appalled him. Days passed, the darkness of affliction continued unbroken. Anna feared that he would sink under his load. True wife that she was, she intuitively understood, soothed, and offered him the comforts of faith and trust, and bore his burdens like a very heroine. She was his ministering angel, and at length he emerged from his gloom in a measure and returned to the printing rooms, still oppressed with the thought that he had been cruelly wounded in the house of his friends.

Punctual to the day the Doctor appeared, accompanied by his brother, James Faust; the former having of late partly resumed goldsmithing, although still a member of the firm.

"The month has expired, and I have come for the money!" said Faust.

"I have not been able to raise it," replied Gutenberg.

"But it is high time that it was paid," said John Faust. "It is nearly five years since it was borrowed. You promised that we should make our fortunes long before this."

"I did not name the time of paying any sum," returned the inventor, "nor did I borrow the money, but it was put into the firm for our mutual advantage. You were, moreover, to pay me eight hundred florins for my personal use, in consideration of my teaching you the secrets of my art. This was not paid me, but was put into the funds of the association for our joint benefit."

"It was borrowed money, every florin!" cried Faust, "and you are holden for it. If no time was specified for payment, on demand is of course understood."

"As to the other sums," continued Gutenberg, "I can give you an exact account of them; but I am not liable for the interest, since you had an equivalent for my use of the money, and indeed appropriated it equally with myself."

"There is a way of settling that point," significantly remarked James Faust, as the two took leave; and shortly he instituted a process of law, and procured from the notary public the following document: —

"To the glory of God, Amen. Be it known to all those who see or read this instrument, that in the year of our Lord 1455, third indiction, Thursday, 6th day of November, the first year of the Pontificate of our very Holy Father the Pope Calixtus III., approved here at Mayence, in the great

parlor of the Barefooted Friars, between 11 o'clock and midday, before me, the notary, and the undersigned witnesses, the honorable and discreet person James Faust, citizen of Mayence, who in the name of his brother, John Faust, also present, has said and declared clearly that on this said day at the present hour, and in the same parlor of the Barefooted Friars, John Gutenberg should see and hear taken by John Faust an oath conformably to a sentence pronounced between them. And this sentence read in the presence of the Honorable Henry Gunter, Curé of St. Christopher's of Mayence, of Henry Keffler, and De Becktoff de Hanau, servant and valet of the said Gutenberg: John Faust, placing his hand upon the Holy Evangelists, has sworn between the hands of me, the notary public, comformable to the sentence pronounced, and has taken the following oath, word for word: 'I, John Faust, have borrowed 1,550 florins, which I have transmitted to John Gutenberg, which have been employed for our common labor, and of which I have paid the rent and annual interest, of which I still owe a part. Reckoning therefore for each hundred florins borrowed, six florins per annum, I demand of him the repayment, and the interest, conformably to the sentence pronounced, which I will prove in equity to be legal, in consequence of my claim upon the said John Gutenberg.' In presence of the

Honorable H. Gunter, of Henry Keffler, and of Becktoff de Hanau aforesaid, John Faust has demanded of me an authentic instrument to serve him as much and as often as he hath need, and in the faith of which I have signed this instrument, and have set thereto my seal."

The law took its course. The inexorable judges made no allowance for the peculiar circumstances of the case, but gave judgment against Gutenberg, awarding that he should pay to Faust whatever he had borrowed, with interest. This decision was made November 1455. As Gutenberg had no means of paying the sums demanded, Faust took possession of his presses, type, printing materials, and the copies of the Bible, finished and unfinished.

Gutenberg had been sustained, during the sitting of the court in the parlor of the Barefoot Friars, by the suspense and excitement of the scene. He had hoped for justice, or at least for a more favorable decision; but instead of that, everything was taken from him. Reaching home, he knew not how, after long wandering in unfrequented places, he threw himself upon his couch, and made no reply to the affectionate inquiries of Anna. She knew that the cause had gone against him, and that he was in the extremity of trouble. As he gave way to his trial, although herself in deep grief, her heart somehow grew stronger. There had been a

marked change in her since residing at the Zum Jungen. As she realized that good would result from her husband's inventions, she strove to encourage him in his devotion to his art. In his despair, she was buoyed up by hope. For long hours he seemed scarcely to notice her gentle presence. She did not disturb him with words; but as the hours stole by, and his grief was heavy on him, she drew the curtains till the room was in the hush of twilight, hoping that balmy sleep would overtake him; then, sitting by his side, she prayed earnestly, silently, for him. When he awoke after a refreshing sleep, he was more like himself.

"Dost thou know, my Anna," he calmly said, "that Faust has laid claim to everything, including my presses, stucke, and the printed pages of the Holy Bible now ready to be bound?"

"Can it be possible?" ejaculated Anna in dismay.

"And I am worse than penniless," he added. "My noble art is at an end. That which I most feared has come upon me. Others have stolen my invention and I have nothing left."

"But we are taught by our holy religion," she quickly responded, brushing away her tears, "that it is good to trust in the Lord in times of trouble, and if we have faith in him, he will deliver us."

Yet sorely was the inventor tried; and month

after month, the weary time crept on, Gutenberg and Anna in poverty and affliction.

Meanwhile Faust, having taken possession of everything that could be called Gutenberg's, organized a new company by associating Schoeffer and others with himself, and finished binding the remaining copies of the Bible as rapidly as possible. As Faust and Schoeffer examined it anew, they were filled with admiration.

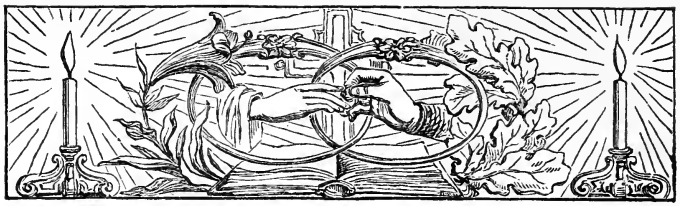
"This book will bring handsome returns, Peter," said the former, "if we manage wisely. My brother is of opinion that I can sell fifty copies in Paris alone!"

"A happy suggestion!" was the reply.

"And I must go at once," said Faust; and, with characteristic energy, he commenced making preparations for the journey. As a sufficient number of Bibles were ready for the present demand, Schoeffer and the journeymen were to employ themselves in issuing "Litterariæ Indulgentiæ," a one page work much prized by the monks.

Schoeffer had now been married to Faust's daughter for some months, and was an honored member of the firm. But although his worldly prospects were fair, yet he was less happy than he had imagined, and the memory of his old master's kindness often brought penitent tears to his eyes. He longed to see him, as formerly, the ruling spirit in

the printing rooms, but had not moral courage and decision of purpose enough to say this in the presence of Faust. Besides, he still wished to appropriate riches and fame to himself. So he persisted in the wrong, salving his conscience with the promise that he would at some time do right by Gutenberg.



XVII.

The Story of Faust's Visit to Paris. — Was it Witchcraft? — Popular Excitement. — Scene in a Court Room. — Issue of the Psalter.

ONE balmy morning in the spring of 1456, Faust, with a stock of beautifully bound Bibles, started for Paris, some four hundred miles distant. Sailing down the Rhine to Strasbourg, he then travelled by the public road over mountains and across the country nearly west to the French metropolis, then a long and toilsome journey.

On his arrival, he engaged a shop on the Rue St. George, where he could safely store his treasures.

Hastening to call upon the King, he made known his errand and offered him a copy of the Bible for seven hundred and fifty crowns!

As the King examined it, he was delighted with the regular and beautiful writing.

"It is true," said he, "that the scribes ask only

five and six hundred crowns for a copy of their Bible, but I have never seen anything equal to this! I will gladly pay thee thy price, and consider it a rare bargain."

Faust next sought out the Archbishop.

"My lord," he said, taking the large package from the porter who accompanied him, and unrolling it from its folds of vellum, "I have brought thee a Bible executed with great care and finish. Permit me to call thy attention to it."

"It is very finely executed," observed the Archbishop as he turned its leaves. "What is your price?"

"Only three hundred crowns!" answered Faust.

"I will willingly pay that," replied the Archbishop. "It is seldom that we can obtain a work made in this style, and so cheap. I am familiar with the copyists of monasteries, but have never met the monk that carried so even a hand!"

Making no explanations, Faust took the money, and returned to his lodgings on St. George's Street, where in a few days he privately sold some half-dozen more copies. Citizens now began to gather to admire the wonderful book.

At first he only exhibited one at a time, and the impression went abroad that the books were very scarce; hence people were more anxious to buy, and readily paid the fifty crowns which he asked lay purchasers.

For a time each one who bought a Bible thought himself especially favored, supposing that his was the only copy of the kind to be found. As a writer has said, "The beauty of the work, the elegance of the flower-pieces, and the variety of the finest colors which were intermixed with gold and silver, led many persons to show their purchases to their friends, each one thinking, as he produced his, that the whole world could not contain such another."

As for the Archbishop, he was so elated with his copy, that he could not rest until he had carried it to the King, who, greatly surprised, in return showed his own. On comparing them, they noticed that the ornaments were not exactly the same. They were not gilded precisely alike, and the initial letters were painted differently. But in other respects, the part which they supposed written, the number of pages, lines, and letters were the same; and they began to surmise that those Bibles were made in some new way. No man could have copied them both, and made them so entirely similar. Besides, to write out two such Bibles would have exceeded the work of a man's life; and the materials on which he wrote would wax old with age meanwhile, but these were new and fresh. The King and the Archbishop were sorely puzzled; and rumor was not long in bringing to their ears that Faust had sold quite a number, some at fifty

crowns, some at twelve, and others still as low as six pounds, while the supply continued equal to the demand. All Paris was agitated.

"What can this mean?" said the King.

"What can this mean?" echoed the Archbishop.

"These books were made by no earthly power!" exclaimed an ecclesiastic.

"The Evil One had a hand in it!" cried the ever-at-hand courtiers.

And although the Bibles were beautiful, costly, and desirable, these good people deemed it necessary to put an immediate stop to their further sale. Much as they prized them, they could not encourage collusion with the powers of darkness. In the midst of this excitement two professors of the University of Paris, as Neiritz informs us, came in and purchased a Bible. A servant bore it after them as they left the shop.

"Antoine," exclaimed one of them to the other, "it is a wonder to me how the German Doctor can afford to sell this Bible for six pounds! Who ever saw such beautiful writing? It is so uniform, I cannot cease admiring the book. Andre, bring it hither!" and as the servant brought it forward, and it was again opened, a circle gathered to examine it.

"How very beautiful!" exclaimed Professor

Antoine, "it scarcely could be done by mortal hands."

"The thing is not possible!" said the brother professor.

"It is done by the famous black art!" affirmed a voice in the crowd.

"Yes, look at those black pot-hooks and hangers!" exclaimed another.

"Father Clement says it is the work of magic and witchcraft!" said a third.

"The German Doctor has made a bargain with the Evil One, being taught the black art as an offset for going to perdition."

"Well, Antoine," remarked the first professor, mirthfully, "if magic and witchcraft can make Bibles in this style, keep them at it early and late, and get out of them all the good you can. Besides, a house divided against itself cannot stand."

But people generally took the matter more to heart than did the genial professor, and, as they chatted about it and thought it over, were more and more satisfied that other than mortal hands had fabricated the Bibles.

"Only to think of it, so many copies just alike, and made so rapidly! And the more you take away from the shop, the more there are for sale! Parisians are as quick-fingered as any other nation, but not one of our fleetest scribes can write in this way; neither can any man do it!"

So the mob searched Faust's lodgings, or the shop on Rue St. George, and seized a great number of Bibles. "Behold," said they when they saw the red ink with which they were embellished, "this is his blood!"

The city authorities were at once apprised that he was a magician! And accordingly orders were given to apprehend Dr. Faust for being in league with Satan, and for dealing in the black art.

"What have I done?" asked Dr. Faust, as the police officers appeared in his shop to take him.

"Only a small thing truly!" ironically replied one of them; "this indictment says that you turn off books by witchcraft."

"Never!" exclaimed Faust; "I have made them in an honest way!"

But the officers shrugged their shoulders, and took him along.

Faust was in trouble. If he confessed the truth, others would seize his art and profits; and if he did not, his life might be sacrificed. While he was revolving the matter, he was thrust into prison.

For once he was at his wit's end, and almost paralyzed by the turn affairs had taken. What! he, the man of wealth and the patron of printing, in prison, classed with felons! It seemed to him like a horrible nightmare, only the chilliness of the cell and the damp straw brought on his old rheu-

matism, reminding him too well that it was all reality.

"I shall die here!" he groaned, as he sleeplessly tossed on the straw; "I must reveal the secret, and save my life!" Never was a more restless prisoner. Sleep! he would as soon think of it on a plank in the open sea. In the morning the court set, and Faust was brought to the bar.

Bibles were produced and compared, witnesses were not wanting, and the case was strong against him, when he was called on for his defense. Perfectly calm, and self-possessed he thus addressed the judge: —

"May it please your Honor: It is not the black art that I practice, but the art of printing. This newly discovered art was first devised by John Gutenberg of Mayence, and afterwards more fully improved by his journeyman, Peter Schoeffer, and myself. I can in a short time so describe the process to you that you may yourself set type and print. We employ young men to help in the work, and there is no more black art in it than there is in planting a garden. Think you the Evil One would lend his aid to the work of multiplying copies of a book that describes him and his wiles, warning men against him and predicting his doom! Nay, your Honor, the thing is absurd. We Germans lead the way in this matter of printing books, —

Eatus vir qui non
abijt in consilio impiorꝝ
et in via peccatorū non
stetit: & in cathedra pesti-
lentie non sedit. Sed
in lege domini voluntas

SPECIMEN OF PSALTER, PSALM I.

begging your Honor's pardon, while I say it, — but it will not be long before printing machines will be common in Paris."

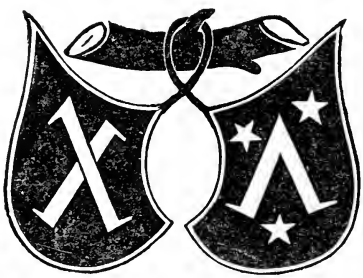
Such was Faust's defence, which so wrought upon the lively crowd that they were enthusiastic in their cries of "*Vive le Docteur! vive le Docteur!*" The magistrates eagerly withdrew the charges against him; and the sequel was that some of the nobility of Paris made him a magnificent pecuniary reward.

When Faust returned from Paris, he prosecuted the business of printing with renewed energy. He could well do this, as his enterprise had been very remunerative. Besides issuing the "Litterariæ Indulgentiæ," he urged on the completion of the Psalter, an elaborate work which had been in press two years and a half, before the lawsuit overtook the firm. As it was not published until August, 1457, it was four years in being brought to perfection. It bore the colophon of Faust and Schoeffer, and was the first book that had the name of the place where it was printed, the name of its printers, and the year when it was printed.

That this elegant book was partly the work of Gutenberg, is evident from the fact that it was four years in being published, and was issued only eighteen months after the partnership was dissolved.

It was printed in large cut type, with illuminated initials; and as it is impossible that Gutenberg's works could have been undone, a new fount prepared, and so splendid a book printed, in so short a time, it is plain that this was the identical Psalter on which the labor of two years and a half had been expended, before Faust sued Gutenberg. It was the latter who proposed to bring it out, and who superintended the construction of the type and ornaments. The superb initial letters, of which the initial B in this volume is a specimen, were projected and criticised by Gutenberg. It is true that Schoeffer's practiced hand executed them, but the original idea was suggested by the leading spirit of the company.

Yet this Psalter appeared in 1457 with the colophon or monogram of Faust and Schoeffer.



This was a device indicating something respecting the authors or proprietors of a volume, and, in this case, was composed of two *ecus*, or shields, which were taken from the armorial bearings of

their families. As Gutenberg was of the nobility, some have affirmed that the monogram alluded to was his device, and adopted by the three partners before they separated; if otherwise, and it simply referred to Faust and Schoeffer, these partners did an act of great injustice in omitting his name from the colophon or conclusion of the Psalter.

XVIII.

New Friends. — The Nun. — Gutenberg at Work again. — Printing of the "Balbus de Janua." — Other Works. — A Curious Record. — Death of the Great Inventor. — Fadeless Laurels.

WAS the art for which Gutenberg had toiled all his life, forever to be torn from him, and his rivals alone garner the fruits? In his despondency Anna was hopeful. She would often say to him, —

"There will be a way of deliverance. Thou has wintered with misfortunes ere this, and camest forth unharmed; and now, even if everything is taken, God can change the hearts of those who have wronged thee, and incline others to enlist in thy behalf."

"Those are noble sentiments," Gutenberg would reply; "and if all things else are adverse, my Anna is true, and gives me good counsel."

Genuine faith is never unrewarded; and as if to encourage Anna, about this time Friele Gutenberg, having returned from Venice, where he had spent some years, visited his brother at the Zum Jungen. Gutenberg told him the story of his art, and how,

when he had nearly completed the Bible, he was overwhelmed by a lawsuit, being unjustly required to pay money to Faust before he could raise anything from the sales.

Friele was shocked at the recital; and at his request Gutenberg conducted him to the printing rooms, and showed him copies of the Bible.

"Why," exclaimed Friele, "this is indeed wonderful! It is the most beautiful book I ever beheld. And is the issuing of it entirely taken out of thy hands, my brother?"

"It is even so," was the reply. "I have been constrained to retire from the firm, and have no means to prosecute the art which has been the study of my life."

"But yours is a success," said Friele. "You ought to be encouraged. I will aid you to the extent of my ability, and influence my friends to do something for you. There is also something due you from our father's estate, which will soon be settled; and this, with other sums, will establish you in business under favorable auspices."

This was so unexpected that Gutenberg, overcome, could only press his brother's hand in grateful silence.

Friele's sympathies were indeed earnestly enlisted in his brother's cause. The injustice and ingratitude of Faust and Schoeffer stirred his indignation,

and he resolved that the true inventor should again engage in his chosen vocation. He soon sought out his sister Hebele, who, although a nun in the St. Claire Convent, was not wholly inaccessible to her brothers. She retained her old affection for her favorite John, and, on hearing Friele's rehearsal of his successful invention and subsequent losses, voluntarily offered to loan him the sixty florins which was soon to be paid her from the estate of her father.

"My noble Hebele!" exclaimed Friele enthusiastically, "that is so like thyself! How it will encourage John! I will do as much on my part, and I doubt not we shall soon have the gratification of again seeing him prosperously printing."

Friele was a man of standing and influence in the city, and lost no time in conferring with his friend, Conrad Humery, Syndic of Mentz. This good dignitary became so deeply interested in Friele's accounts of his brother John's struggles, triumphs, and wrongs, that he begged at once to be introduced to him. Friele accordingly accompanied him to the Zum Jungen, where they found John Gutenberg in a back room, busy polishing gems, and Anna diligent at her embroidery frame.

The Syndic was past middle age, affable and easy, the goodness of his heart beaming in his expressive eye and fine countenance. Gutenberg felt acquainted with him almost intuitively, and, in an-

swer to his kind inquiries, briefly related the history of his long experiments and checkered experiences.

"That last lawsuit was most scandalous!" said the Syndic; "such a thing ought not to be tolerated in Mentz! Would that I had known of thy trial at the time; I doubt not the case might have been adjudged differently. I will, however, do what I can for thee."

He was as good as his word. Fully appreciating Gutenberg's estimable qualities, he even offered to lend him money, again to commence in business, and would, if desired, become a silent partner.

This was most welcome to Gutenberg, and he cordially accepted his generous proposals.

At Friele's suggestion, he lost no time in removing into the mansion formerly occupied by his father, where his brother now lived. It was a fine old edifice, roomy, baronial, and substantial, dating back hundreds of years. It was in no sense inferior to the Zum Jungen; and the inventor had a comfortable suite of family apartments, as well as convenient printing rooms.

Previous to his removal, as he was making preparations to leave, Dr. Faust called on him, and, extending his hand, said, —

"I owe you many apologies, master, for my unjust treatment in the matter of the lawsuit. It costs me an effort to admit this; but I feel that I

have injured you, and must seek to make amends. I have been to Paris, engaged in the sale of Bibles, and have seen your connection with the art of printing as never before. Success has softened and removed my prejudices; and I shall have no peace of mind until you pardon me, and take your place in the firm."

Gutenberg was both surprised and indignant. He had been foully wronged by Faust and Schoeffer, and it seemed like adding insult to injury for them so late in the day to make amends by bald apologies. He had been too much hurt by their unkindness to think of resuming his former position as partner.

"Moreover," urged Friele, to whom he confided the matter, "you cannot think of accepting merely nominal concessions. They do not frankly confess how cruelly they have wronged you. And were you to join the firm again without as public a confession as the insult they gave you, you would be wanting in self-respect. And what guarantee can you have that they will not treat you ill a second time? I counsel you to remove to the homestead, where you can have ample facilities for prosecuting your chosen employment."

We can only conjecture the motives which influenced Faust in his apologies to Gutenberg. Perhaps, now that his pecuniary trial was over, he felt

sincerely to regret the separation from the distinguished man who he must fain acknowledge was the originator of the art which had brought fame and money to himself and partner. Or it may be that he dreaded his influence as a rival.

Waiving Faust's proposal, Gutenberg hastened to established himself in the mansion of his ancestors.

In resuming printing, he found much delay from the necessity of making everything anew. He had irrecoverably lost the labor of years. He must construct more presses, another set of punches, and new type. The presses were manufactured in as good style as those he had relinquished; but sadly he missed the nice execution of Schoeffer in getting up the punches and type.

He was, it is true, aided by two of his old office workmen,— Martin and Hanau; but his *stucke* was nevertheless inferior in finish to that which Schoeffer devised. He would not, however, relinquish his enterprise on that account, but proceeded to print the "Balbus de Janua."

"Why not print more Bibles?" asked Martin Duttlinger in 1457, after they had issued the "Balbus de Janua."

"My Bibles are being printed by others!" replied the inventor, sadly. "This care is taken from me; but I have the satisfaction of knowing that it will be done as I planned it. I selected the vellum.

How many journeys I made to the manufacturer to insure a good article! How I criticised and experimented with it until I succeeded in getting a smooth, fine texture! The ink, too, what a labor it cost me! And the regularity of setting up the page,—it was long before we attained it. The cutting of the type occupied us a long time until we found the method of casting it; and now, with the help of punches, we can make the same elegant type. Why should I seek to issue another edition of the Bible, when my own is publishing? I cannot compete as a salesman with Faust; and the present Bible which is printing is as really my own as another could be."

"But will you not at least publish a Psalter?"

"Not at present," replied Gutenberg; "this which Faust and Schoeffer are issuing has been in press four years. When they thrust me from the firm, the type was in readiness, and a portion of it was set up. Two years and a half we had lavished skill and money upon it. This also I must consider mainly my own, as I planned to issue it, and superintended the work. Others reap my harvest; but they cannot destroy the peace and satisfaction I enjoy in the consciousness of having been the instrument of doing good." Thus did the truly great man put by all selfish considerations.

However, he continued to print various other

works, among which were the "Donatus," the "Catholicon," "Speculum Sacerdotum," "Celebratio Missarum," and others.

There is on record a curious deed, or grant of property, which gives quite an inkling of his affairs in 1459, when his brother Friele was associated with him as a successful publisher.

This legal instrument is as follows: —

"We, Henne (John) Gutenberg and Friele Gutenberg, brothers, do affirm and publicly declare by these presents, and make known to all, that with the advice and consent of our dear cousins, John and Friele and Perdiman Gensfleisch, brothers, of Mentz, we have renounced and do renounce by these presents, for us and for our heirs, simply, totally, and at once, without fraud and deceit, all the property which has passed by means of our sister Hebele to the Convent of St. Claire of Mentz, in which she has become a nun; whether the said property has come to it on the part of our father, Henne Gensfliesch, who gave it himself, or in whatever manner the property may have come to it, whether in grain, ready money, furniture, jewels, or whatever it may be, that the respectable nuns, the abbess and sisters of the said convent, have received in common or individually, or other persons of the convent, from the said Hebele, be it little or much. . . . And as to the books

which I, the said Henne (John), have given to the library of the convent, they are to remain there always and forever; and I, the said Henne, propose also to give in future to the library of the said convent, for the use of the present and future nuns, for their religious worship, either for reading or chanting, or in whatever manner they may wish to make use of them according to the rules of their order, *all* [that is, copies of *all*] *the books which I, the said Henne, have printed up to this hour, or which I shall hereafter print, in such quantities as they may wish to make use of;* and for this the said abbess, the successors, and nuns of the said Convent of St. Claire have declared and promised to acquit me and my heirs of the claim which my sister Hebele had to sixty florins which I and my brother Friele had promised to pay and deliver to the said Hebele as her portion and share arising from the house which Henne (John) our father assigned to him for his share, in virtue of the writings which were drawn up thereupon, without fraud and deceit. And in order that this may be observed by us, and by our heirs, steadfastly and to its full extent, we have given the said nuns and their convent and order these present writings, sealed with our seals. Signed and delivered the year of the birth of J. C. 1459, on the day of St. Margaret." [1]

[1] Lamartine refers to an act of donating, made by Gutenberg

Although it is evident from this deed that Gutenberg was at this time successfully established in printing again by means of a further division of his father's estate, and by the aid of his friends, yet it also appears that his works were not remunerative. Comparatively few books were called for, — not only the books, but the market for them, had to be made; and this, when we consider the competition of such a firm as Faust and Schoeffer, was no light affair. The worthy Syndic stood nobly by him, and his friends were kind and appreciative, or he had accomplished much less after the breaking up of his favorite projects at the Zum Jungen.

But a sad and deeply afflictive event overtook him, which again threw his affairs into confusion. This was the sudden death of his beloved Anna, who left his side with an angel's smile and words of triumph for the endless life. The unexpected blow completely unnerved him for a long time; and even when the healing hand of time soothed the wound, he had no heart to go on with an art with which she was so intimately associated.

Friele sympathized most deeply in his sorrow, and at length advised a change of scene and occu-

to his sister Hebele, nun in the Convent of St. Claire at Mentz, by which he put her in possession of the religious books *which he had printed at Strasbourg*, and made her the promise of sending her successively all those which should issue from his press.

pation as antidotes to his grief. Accordingly he sold out his printing materials to the Syndic, Conrad Humery, after some eight years' practicing of his art in the new firm.

But he was not allowed to be forsaken in his old age. From letters patent, dated January 17, 1465, we learn that he was invited to enter the service of the Elector Adolphus of Nassau, as one of his band of gentlemen pensioners, with a handsome salary. Thus did he honorably retire from the practice of his loved art, secure in the thought that although it had cost him much tribulation, yet it was firmly established in doing its beneficent mission to the world.

This was three years after the city of Mentz was sacked and plundered by Count Adolphus; and while others were broken up in their avocations and forced to flee, he was spared from such a fate, and was promoted to his own appropriate honorable place in his native city.

Thus peacefully and in useful duties did he go down the vale of life, until February 24, 1468, when he quitted this earthly scene, let us trust for the happier employments of the better world. His death seems like the calm, unclouded setting of the sun, after a tempestuous day.

Some one has said that genius, in its general sense, is universal; a possession belonging to all

men, in some degree. Its greatest achievement is not in a great poem or painting, or any other work of art, but in a great life; and the strong heart and stout hands are its most miraculous organs. He who, by the majestic dignity of his daily walk, gives the beauty of truth to common life, is a great genius, — because he illustrates and sets forth, in its noblest form, virtue and true worth.

So Gutenberg, after he had done the will of God, and had been led on to perfect the most glorious invention under the sun, had need of patience. The Heavenly Father would not permit so chosen a son to become perverted by unmingled prosperity.

Hence he suffered him to be disappointed, and the patient hero was evidently blessed by his trials. He became, if never before, that which so few attain, "commander of himself;" and this, according to a wise author, is no small triumph. "He that ruleth his spirit is better than he that taketh a city."

Several trying lawsuits diversified the eventful life of Gutenberg. They were grievous and harrowing to his sensitive feelings, but subserve a good purpose to posterity, giving many well-authenticated facts respecting him, which otherwise would have been lost. Little did he think, while passing through these fiery ordeals, that he was by them really inscribing the deeds of his life on the scroll

of fame. We moderns, seizing upon each item in the law records as a choice morsel of literary history, are prone to forget that they were made at the sacrifice of the peace and comfort of the inventor.

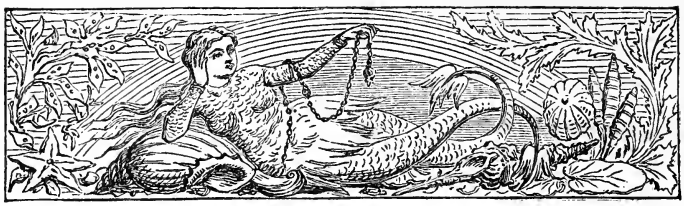
Especially was the writ of the notary public, summoning Gutenberg to the parlor of the Barefoot Friars, a crushing event. It came when he was just on the point of realizing his fondest hopes, — when the Bible was printed, and almost ready to be issued from the press. By this process of law, he was under the necessity of mortgaging his printing materials to Faust; this shows that his large private fortune had been previously expended in experiments, and that thus he had fallen into the clutches of his more wealthy partner.

Because the great invention failed to bring in money as soon as the firm had hoped, Faust must needs take the law on Gutenberg, seizing his printing materials, wrought out with so much thought and toil. The presses, the plan of which had been for years ripening in his brain, and to secure the making of which cost him so much money, were no longer his; neither was the type which he invented at such an expense of time, effort, and money, nor yet the illuminated letters designed under his eye. Yes, the very initial letters used by Gutenberg and his firm, in works executed between 1450 and

1455, were also used by Faust and Schoeffer in the Psalter of 1457 and 1459. After so much effort almost in vain, what wonder if Gutenberg had become disheartened, and yielded to despair! Far from that. His indefatigable spirit knew no rest; many floods could not quench the fire of his perseverance; he started again, laid the foundations, and successfully wrought in new printing rooms, his Bible and his Psalter meanwhile being printed by other hands.

But there were certain considerations which alleviated the poignancy of Gutenberg's disappointment. He had the consolation of knowing that he had designed the enterprise of publishing the Bible, and that he had carried it successfully to its termination. And now, with the magnanimity of a great soul, he was willing that others should circulate it. Besides, he had at times a hope that he should yet have justice done him. It was as true then as now that a man may be disappointed in his greatest hopes in life, without, on that account, becoming unhappy; for, as one has said, "There is no other actual misfortune except this only, *not to have God for our friend.*"

And this art of printing, which had been such a trial and triumph, such a grief and a joy, was destined to embalm his name and the memory of his life infinitely more than if all the conquests of world-renowned warriors were his.



XIX.

Faust and Schoeffer's Success. — More Books issued.— An Eventful Year. — Greek Type. — Struck by the Plague. — The Parisians, and Faust's Descendants. — Schoeffer's Death. — Testimony to Gutenberg. — Extension of the Art.— Piety and Chess. — Education in the Olden Time. — Unveiling the Statue.

TO return to Faust and Schoeffer. After the lawsuit, as we have seen, they mostly ignored the existence and services of Gutenberg. Soon after the memorable separation, Faust went to Paris as before related, the sales of Bibles in Germany alone being so limited as to bring in but small returns for the money invested. It was evidently necessary to take extraordinary measures to meet the emergency. In Faust's cool, business-like view, everything would be lost, unless some speedy and marked success was attained. His experiments resulted better even than he had anticipated; and returning flush with money, the printing rooms soon presented a scene of unwonted activity. The "Litterariæ Indulgentiæ," with which Schoeffer and

his journeymen had busied themselves during Faust's absence, was urged through the press and into the market.

"What a difference a little money makes!" said Faust, as he saw how well the book was selling. "We must hasten to finish the Psalter."

This was ready for purchasers by August 1457. It was in the highest style of the printing art of the age, and could not be excelled. As Faust and Schœffer gazed on its beautiful pages, how could they forget the inventor who designed the publishing of the work, and labored with them in executing it full thirty long painstaking months! Yet they uttered few words of acknowledgment. For two years they were occupied in striking off, binding, embellishing, and selling the Psalter, with the additional labor of casting a new fount of type. While Schoeffer and his assistants were engaged in this absorbing toil, Faust again visited Paris to dispose of the Psalter. By this means he replenished, once more, the treasury of the firm, and returning about the time the new fount was finished, they printed the "Durandi."

The next year, 1460, the "Constitutiones" appeared, and in 1462 a new edition of the Latin Bible. This last was the eventful year in which the city of Mentz was taken, sacked, and plundered by the Elector Adolphus of Nassau. Such was

the confusion and distraction occasioned by this unlooked-for event, that almost all business was suspended. The journeyman printers, being suddenly thrown out of employment, fled panic-stricken to other countries; and considering themselves freed from their oath, the great secret of thirty years was spread abroad.

Faust and Schoeffer, left almost alone in their printing rooms, effected little for some time. At length Schoeffer's busy brain hit upon something new in printing; and with his usual patience and assiduity he fell to casting a fount of Greek type, and in 1465, some little time after Gutenberg had retired from his art, issued "Cicero de Officiis," using the new Greek type. On occasion of printing anything of special importance, Faust continued to visit Paris, then the chief seat of learning; and so great a work as this of Cicero in Greek would of course be welcomed with avidity by the professors and students in the University. As soon as possible, therefore, he hastened to that city, furnished with a good supply of the much-coveted volume. This was early in 1466. He was received with enthusiasm; for such had been the reputation of the previous works circulated by him in the French metropolis, that he had a large circle of admiring patrons and friends. But alas for the uncertainty of earthly things! while yet in the midst of success

and gratulation, he was seized with the plague, and died after an illness of a few hours! The Parisians were loud in their expressions of grief, and a large concourse gathered at his funeral. The learned men and nobility of the city assembled; distinguished honors were paid him; and the sequel was, that in commemoration of the signal services he had rendered them, they continued a generous pecuniary reward to his descendants.

The dreadful shock occasioned by the death of his father-in-law, deeply affected Schoeffer. May we not suppose that in his loneliness and affliction, he sought a reconciliation with his old master, Gutenberg? There is, indeed, evidence that this was the case; and we are permitted to infer that the breach was healed, suitable acknowledgments being made by Schoeffer, as he plainly saw that the mortgage act which made Faust master of Gutenberg's property, did not include his genius. In later years he frankly confessed as much to Trithemius, Abbot of Spanheim Monastery, a celebrated scholar and author. Says this writer, after mentioning that he had his information from the mouth of Peter Schoeffer, the inventor of cast metal types: —

"About this time that wonderful and almost incredible art of printing and characterizing books,

was thought of and invented by John Gutenberg, a citizen of Mentz."

Then follows some of the main particulars of the invention on which we have already dwelt. He also mentions that "Gutenberg spent all his substance in quest of the art, and met with such insuperable difficulties, that, in despair, he had nearly given up all hopes of success, till he was assisted by the liberality of Faust, and by his brother's skill in the city of Mentz."

Schoeffer, having associated with him Conrad Henliff, nobly presided over the interests of the great art after Gutenberg's death, diligently issuing elegant editions of various books. His last work was a new impression of his master's superb Bible in 1502, in which year he died, after laboring thirty-five or thirty-six years as a printer. His monogram is connected with Faust's ; and, as we have mentioned, some suppose this also to have been the device of Gutenberg.

The name of Schoeffer means shepherd ; and well did the thoughtful care, caution, and ingenuity of this man aid in watching over the young art, that needed such vigilant cherishing to bring it to maturity. He was once Gutenberg's right-hand man, next to him in genius in devising, and, despite his doubtful course afterwards in leaving him, was an honor and a blessing to his country. His son John

succeeded him in his office, and later still his grandson John chose the same employment.

Of Costar, little can be said. Some even suppose that no such person ever existed; while others incline to confer on him honors which he never earned. It is certain that he did not reach the idea of movable types. He died in 1440, when Gutenberg had been familiar with their use for years.

The capture of Mentz, in 1462, was the means of carrying the knowledge of the art of printing to Hamburg, Cologne, Strasbourg, Augsburg, and other cities; and in a short time books were issued from many places. Twenty-four different works appeared between 1460 and 1470; in the latter year two of Faust's workmen commenced printing in Paris. Also, in 1470, the art was practiced in Venice. Cennini, a goldsmith, established printing at Florence; and so industrious were the Italians that they printed between 1470 and 1480 twelve hundred and ninety-seven books, two hundred and thirty-four of which were editions of ancient authors. Presses were also established in the Low Countries, at Utrecht, Louraine, Basle, and at Buda in Hungary; and, indeed, in the course of a few years, every town of any importance possessed its printing-office, so that books were greatly multiplied.

Several women of France early distinguished

themselves in prosecuting the art of printing. Prominent among them was Charlotte Guillard, 1490–1540, the widow of Berthold Rambolt, who for fifty years kept several presses at work, and printed a great number of large and very correct editions, both in Latin and Greek. Her best impressions were issued after she became a widow the second time, — the Bible, the Fathers, and the works of St. Gregory in two volumes, which were so accurate as to contain only three faults. In brief, her fame as a printer was so extensively known that the learned Lewis Lippeman, Bishop of Verona, selected her to print his "Catena in Genesim." With the accomplishment of this, he was so well satisfied, that, after assisting at the Council of Trent, he went on purpose to Paris to return thanks to her, and also gave her his second volume to print, the "Catena in Exodum," which she performed with like precision and elegance.

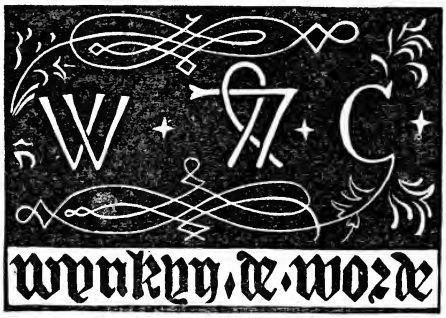
Elfield was more especially noted for its productions in printing, since Henry and Nicholas Becktermange, successors of Gutenberg, there wrought at his presses and other printing apparatus, which were the latest efforts in the art. Says Dibdin, "The works of these men are greatly sought after by the curious, as they afford much proof by collation of the genuineness of the works attributed to their great predecessor."

The first English printer was William Caxton, mercer, or merchant, who became acquainted with the art while engaged in mercantile pursuits in Germany. Returning to England, he established the printing press at Westminster Abbey, in 1480. Although somewhat advanced in years when he commenced, yet such was his industry and perseverance that he translated and printed, in ten years, no less than twenty-five octavo volumes. These were mostly useful literary and religious works, but did not indicate high culture in England. The last work he issued, and on which he was engaged when overtaken by death, was "The Art and Craft to know well how to Die."

After the death of Caxton, Wynken de Worde, his partner, continued to print in his office, living in his house at Westminster, and styling himself "Printer to Margaret, etc., the King's Grandame." He printed the Acts of Parliament with the Royal Arms, also many Latin and English books; in forty years over four hundred volumes.

It is not known that he printed any Greek works, yet he made many improvements in the art of printing. His first care was to cut a new set of punches; he sunk these into matrices, and cast several sorts of printing letters, afterwards used in his books. He was the first English printer who introduced the Roman letter into England, using it to mark strik-

ing thoughts. His type was remarkable for its precision, and for a long time was not excelled.



The art of printing was not long in extending to other places in England besides London. It was started in Oxford in 1480, also at St. Albans in the same year, and many other places, among which were York, Canterbury, Worcester, Ipswich, and Norwich. The "Common Prayer" was printed in Dublin by Humphrey Powell, in quarto, black letter, in 1551. Before and after that period the authors of Ireland had their works printed abroad.

"Euclid's Geometry," the first work in Latin printed with diagrams, was issued from the press of Randolt, at Venice, 1482. Aldus also printed the works of Virgil there, in Italic types, in 1501, the first attempt at producing cheap books.

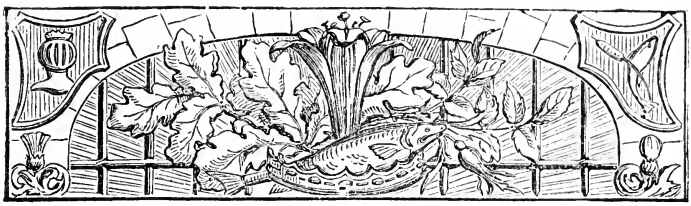
Blaeu, who assisted Tycho Brahe in making his mathematical instruments, effected great improvements in the printing press. He made nine presses, and named them after the nine Muses. His fame

soon reached England, where his excellent printing machines were soon after introduced.

Aldus Manutius, of Venice, during a career of twenty-six years in the employment of printing, produced editions of nearly all the Greek and Roman authors then known to exist. He was also the author of several works of learning, — grammars and dictionaries of the Greek and Latin languages, the last forming a folio volume, the first that had ever been prepared.

For nearly one hundred and fifty years the Estiennes of France were famous as printers. Robert Stephens, a member of this family, was the first inventor of the verses into which the New Testament is now divided, and introduced them in his edition of it published in 1551. Harry, the eldest son of Robert Stephens, was one of the most learned men of his time. "Thesaurus," a dictionary of the Greek language, was the fruit of twelve years' hard application of the elder Stephens, who also suffered persecution for being a Protestant, and fled from France to reside at Geneva. The early printers were well educated; but time and space fail us to note the many learned men who practiced the art in different countries, who, availing themselves of the new sources of information, added to the general stock of knowledge as they eagerly grasped the shining treasures laid open by the discovery of printing.

It is well known that the first printers were learned; and, being engaged in printing from ancient and classical manuscripts, were naturally the associates of the first literary characters of the age. Indeed, in the infancy of printing, and long afterwards, the occupation was very honorable, and was only engaged in by well-educated persons. It was the glory of the learned to be known as correctors of the press to literary printers; physicians, lawyers, bishops, and even popes themselves occupied this department; and a distinguished name, as corrector of the press, being given in a work, it was far more highly valued.



XX.

Peculiarities of the First Printed Books. — Early Printers. — Piety and Chess. — Education in the Olden Time. — A Great Enterprise. — Unveiling Gutenberg's Statue.

ON inquiring more closely respecting the peculiarities of the first printed books and the modes of producing them, we find that they were generally large or small folios or quartos; lesser sizes than these not being in use. In some cases they had no title, number of pages, or paragraph divisions. The character employed was designed to imitate the hand-writing of the time, a rude old Gothic or German, from which the old English was formed, now known as German text. The words were printed so closely together as to make reading difficult even by those accustomed to it, while one unpracticed got on slowly and with many blunders.

The orthography used in the first books was of almost every variety, defying method. Abbreviations were fashionable, and at length became so numerous and so difficult to be understood that a book

or key was published, explaining them. Instead of a comma an oblique stroke was employed. Capital letters were not used to begin a sentence, or for proper names. Blanks were left for the places of titles, initial letters, and other ornaments, in order to have them supplied by illuminators, whose curious art, however, soon gave place to the improvements of the printers. The ornaments made by the old artists to fill the blanks were formed with singular taste; birds, beasts, flowers, and foliage often curiously interwoven with the most desirable colors, and even with gold and silver. Saints were sometimes made to figure in the border of illuminated letters, whether the subject treated required it or not. The artist had no regard to the theme of the author in his adornments. These embellishments were sometimes costly and elaborate; but a cheaper kind could be had. Bibles and Breviaries were most elegantly ornamented.

The name of the printer and his place of residence were either omitted, or placed at the end of the book with some pious ejaculation or doxology. There was no date, or it appeared in some odd place, printed in words perhaps, or by numerical letters, and sometimes partly one and partly the other, thus: "One thousand CCCC. and LXXIII.," but in all cases at the end of a book. The Roman and Italic letters not being invented, the pages were

uniformly Gothic through the book. Only a few copies were issued at once; two hundred was a large impression.

The early printer was of necessity also a book-binder, placing his leaves literally between *boards*, and making some works so heavy as to provoke the criticism, "No man can carry them about, much less get them into his head." About 1469–70, alphabetical tables of the first words of each chapter were introduced as a guide to the binder.

After the great secret of printing was spread abroad, the early printers, in their own quaint style, took pains to inform the public that the book they issued was printed.

Caxton said of his first book, "It is not written with pen and ink as other books be, to the end that every man may have them at once; for all the books of this story, thus imprinted as ye here see, were begun in one day, and also finished in one day;" that is, the edition.

The Mentz printers, at the end of each of their first works, made it known that instead of being drawn or written with a pen, they were made by a new art and invention of printing or stamping them by characters or types of metal set in forms.

King Henry VI. was moved by the Archbishop of Canterbury to use all possible means for procuring a printing mould, as it was then called, to be

brought into England. It is supposed that Caxton, after the custom in other monasteries, set up his press near one of the aisles of Westminister Abbey. The first book printed there was "The Game of Chess," a work then much used by all classes of people, and "doubtless desired by the Abbot, and the rest of his friends and masters." Caxton translated it from the Latin of a Dominican friar, who wrote it in the year 1200. It was in the main a good book, else Caxton, with his decided religious principle, would not have published it; he recommends it as "full of wholesome wisdom, and requisite unto every state and degree." But to us it seems a curious mingling of amusement and advice. There were instructions for playing the game, side by side with counsels which, according to Caxton, would enable the people to understand wisdom and virtue.

The course of study then comprised in what was thought a good education, was very limited. Teacher and pupil in most cases attempted little, and accomplished little. The *trivium* and the *quadrivium* were the two branches of what was then understood as the liberal arts. The former included grammar, rhetoric, and dialectics; the latter, music, arithmetic, geometry, and astronomy. It was thought that he who became master of these studies needed no longer a preceptor or assistance in solving any questions within the compass of human reason.

But thorough students in these branches were seldom found, until the dissemination of books by the art of printing gave a new impetus to the intellect of that age.

Interesting it has been to trace step by step the passing on of this art to perfection. Long were genius and industry engaged in its study, and never was there so rich and glorious a harvest from human efforts. The nurse and preserver of the arts and sciences, of religion and civilization, was not the work of one brain solely, neither did the gift bring peace at once, but rather strife and opposition. Ignorance fled before it as darkness from light; the priests and copyists were disturbed; and the way was made ready for the bringing in of the Reformation, commencing in 1517 under Martin Luther. For doubtless the invention of this art did more to unmask the superstitions of the Papal church than all other causes combined.

Gutenberg's conception and execution of printing the Bible was a magnificent enterprise; through unparelleled difficulties, he produced an eloquent and superb book, which is even now the admiration of the learned. We scarcely know which most to admire, the great art, or the noble purpose to which its incalculable power was lent. His praise is in every land, but most of all do his countrymen love and revere his memory. Statues

of Gutenberg have been erected in several cities of Germany, and festival occasions celebrating his achievements are frequent. A picture of one of these days of grateful rejoicing is the following account of a

CELEBRATION AT MENTZ.

"The modes in which a large population displays its enthusiasm are pretty much the same throughout the world. If the sentiment which collects men together be very heart-stirring, it will be seen in the outward manifestations. Thus processions, orations, public dinners, and pageantries, which in themselves are vain and empty, are important when the persons whom they collect together are moved by one common feeling, which sways them for the time.

"We never saw such a popular fervor as prevailed at Mentz, at the festival of August 1857. The statue was to be uncovered on Monday the 14th; but on Sunday evening the name of Gutenberg was rife through the streets. In the morning, all Mentz was in motion by six o'clock; and at eight, a procession was formed to the Cathedral, which, if it was not much more imposing than some of the processions of trades in London and other cities, was conducted with a quiet precision which evinced that the people felt that they were engaged in a solemn act.

The fine old Cathedral was crowded; the Bishop of Mentz performed High Mass; the first Bible printed by Gutenberg was displayed. What a field for reflection was here opened! The first Bible in connection with the imposing pageantries of Roman Catholicism, — the Bible in great part a sealed book to the body of the people; the service of God in a tongue unknown to the larger number of worshippers; but that first Bible the germ of millions of Bibles that have spread the light of Christ throughout the veritable globe!

The mass ended, the procession again advanced to an adjacent square, where the statue was to be opened. Here was erected a vast amphitheatre, where, seated under their respective banners, were deputations from all the great cities of Europe. Amidst salvos of artillery the veil was removed from the statue, and a hymn sung by a thousand voices. Then came orations, then dinners, balls, orations, boat-races, processions by torch light. For three days the population of Mentz was kept in a state of high excitement, the echo of which went through Germany, and "Gutenberg! Gutenberg!" was toasted in many a bumper of Rhenish wine amidst this cordial and enthusiastic people.

And, indeed, even in one who could not boast of belonging to the land in which printing was invented, the universal and mighty effects of this art,

when rightly considered, would produce almost a corresponding enthusiasm. It is difficult to look upon the great changes that have been effected during the last four centuries, and which are still in progress everywhere around us, and not connect them with printing and its inventor. The castles on the Rhine, under whose ruins we travelled back from Mentz, perished before the powerful combinations of the people of the towns. The petty feudal despots fell when the burghers had acquired wealth and knowledge. But the progress of despotism on a larger scale could not have been arrested, had the art of Gutenberg not been discovered. The strongholds of military power still frown over the same majestic river. The Rhine has seen its petty fortresses crumble into decay. Ehrenbreitstein is stronger than ever. But even Ehrenbreitstein will fall before the powers of the mind. Seeing, then, what, under God, intellect has done and is doing, we may well venerate the memory of Gutenberg of Mentz."

XXI.

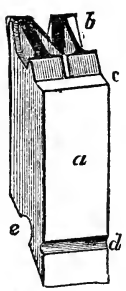
Modes of making Type. — Varieties of Type. — Cylindrical Ink-distributor. — A Modern Printing Establishment. — Composition Room. — Cases. — Proof-reading.

LET us now glance at the Art of Printing in modern times.

In the making of types, formerly each letter was cast, and then finished one at a time, by hand. Now there is a process of manufacturing the copper face by machinery, the operation being effected by the pressure of a sharp die upon copper. And it is said that a small steam-engine can produce one type a second, or thirty-six thousand in ten hours.

By the more ordinary process, types are made by casting type-metal in a mould, though some of the larger sizes are manufactured from maple, mahogany, or box-wood. The process of casting type, which is the business of the type-founders, requires great skill. In the first place, a punch is cut, of the letter to be formed, except that it is in reverse. The punch being of hardened steel, and having this letter on its point, is then struck into a small piece of copper, which is called the *matrix*, or form of the letter to be cast. The matrix is now

fixed in a curiously contrived instrument, termed the mould, attached to a compact hand machine, having in the centre a small furnace of burning coal to keep the vessel of type-metal over it liquid. The workman turns a wheel, thus forcing melted metal into the mould, which quickly shapes and drops one after another the types, perfect, save polishing. In some foundries there are twenty of these machines. In this way not only every letter, but every figure, hyphen, comma, or other mark, must have its punch and matrix, as well as its separate casting. One machine will cast one hundred types a minute.



Metal Type.

In the cut, *a* is the body; *b*, the face, or part from which the impression is taken; *c*, the shoulder, or top of the body; *d*, the nick, designed to assist the compositor in distinguishing the bottom of the face from the top; and *e*, the groove made in the process of finishing.

As soon as a heap of types is cast, a boy takes them away, and breaks off the superfluous piece at the end of each, when another rubs its sides on a stone, to render it smooth. The face, or printing part of the type, is not touched after it leaves the matrix, that giving it all the distinctness and sharp ness of which it is capable.

Type-metal is a compound of lead and antimony, in the proportion of three to one, with a small portion of tin, and sometimes a little copper.

In Gutenberg's day types were necessarily an imitation of the handwriting of the monk-copyists, with little variety and beauty. Now the types which compose an ordinary book-fount consist of Roman CAPITALS, SMALL CAPITALS, and lower-case letters, and *Italic capitals* and lower-case letters, with accompanying figures, points and reference-marks, — in all about two hundred characters. Including the various modern styles of fancy types, some three or four hundred varieties of face are made. Besides the ordinary Roman and *Italic*, the most important of the varieties are

Old English or Black Letter.

German Text.

Full-face, Antique, *Script.*

Old Style, **GOTHIC.**

The smallest body in common use is *diamond;* then follow, in order of size as below —

Diamond..... abcdefghijklmnopqrstuvwxyz
Pearl..... abcdefghijklmnopqrstuvwxyz
Agate..... abcdefghijklmnopqrstuvwxyz
Nonpariel..... abcdefghijklmnopqrstuvwxyz
Minion..... abcdefghijklmnopqrstuvwxyz
Brevier..... abcdefghijklmnopqrstuvwxyz
Bourgeois..... abcdefghijklmnopqrstuvwxyz
Long Primer.... abcdefghijklmnopqrstuvwxyz
Small Pica..... abcdefghijklmnopqrstuvwxyz
Pica..... abcdefghijklmnopqrstuvwxyz
English..... abcdefghijklmnopqrstuvwxyz
Great Primer ... abcdefghijklmnopqrstuv

Until a comparatively recent period, no better method of inking the type had been devised than Gutenberg's sheep-skin dabbers, or stamping balls. Earl Stanhope, who greatly improved the printing-press, sought by many experiments to supply the ink by means of a revolving cylinder or roller, instead of by the old process. The first impediment was the seam which it was necessary to make down the whole length of the roller; and it could be kept neither soft nor pliable. Providentially these difficulties were overcome by observing a process in the Staffordshire potteries, in which the workmen use what are there called dabbers. These dabbers, composed of glue and treacle, possessed every requisite to hold and distribute the ink, spreading it evenly over the form, besides being easily kept clean and pliable. This method was at once seized upon by ingenious printers, who used it in time in the cylinder form, as is common now in all printing offices.

Formerly, the word *the* was indicated by the letters *y* and *e*, thus — *y*^{e}; & was used for *and;* with other ungainly abbreviations. Connected letters were also employed; *c* and *t* were joined by a curve from the top of one to the other; and when two *s*'*s* occurred a long *ſ* was used.

Instead of ponderous folios and quartos, untitled, unpaged, and unparagraphed; without capitals, and

COMPOSITION ROOM.

with words so huddled together as to put the reader to his wit's end to make out the meaning, now we have the beautiful pocket and library editions, convenient in size, clear and intelligible within, — "books that you may carry to the fire and hold readily in your hand," as Dr. Johnson says.

We have, in imagination, visited Gutenberg's Printing Rooms, and can vividly recall his rude beginnings and slow and toilsome methods; his printing-press; the wonder of that age, — only turning off a few hundred impressions per diem. With this in mind, let us step into a representative printing establishment of our times, — the "Riverside," at Cambridge, Mass.; for we wish to get a just idea of the Art of arts. We will first visit the Composition Room.

Ranged down the sides of the room we see scores of laborers industriously at work, each one before a stand or frame, in shape similar to the music-stand at an orchestra. Each frame is constructed so as to hold two pairs of cases, one containing the Roman, the other the Italic letters of the same "fount," or kind. The upper case has ninety-eight little divisions for the different kinds of type; the lower case has fifty-four boxes, arranged as in the diagram on the opposite page. The "compositor" or "type-setter," is said to "work at case;" for all the types are sorted in "cases," or shallow,

open and divided boxes; the lower case, or the one nearest him, having all the small letters, points, and spaces to place between the words, and the upper case containing all capitals, accented letters, figures, and characters used as references to notes. Each letter has a larger or smaller box appropriated to it, according as it is seldom or frequently required, while the letters most needed occupy the position most convenient for the compositor.

In the English language, the letter *e* inhabits the largest box; *a*, *c*, *d*, *h*, *i*, *m*, *n*, *o*, *r*, *s*, *t*, *u*, live in the next-sized apartments; *b*, *f*, *g*, *l*, *p*, *v*, *w*, *y*, dwell in what may be called the bed-rooms; while *j*, *k*, *q*, *x*, *z*, *æ*, and *œ*, double letters, etc., are more humbly lodged in cupboards, garrets, and cellars, as we call the various compartments of the case. The reason of this arrangement is, that the letter *e* being visited by the compositor sixty times as often as *z*, — his hand spending an hour in the former box for every minute in the latter, — it is advisable that the letters oftenest required should be in the nearest and largest boxes; everything being systematized so as to secure accuracy and despatch.

Behold the busy company. Eyes, fingers, and arms move almost in every direction with steadiness and speed. Some are "distributing;" that is, filling their cases with letters from the type pages of books or papers which have been printed

&	fl	ff	fi	j	k		1	2	3	4	5	6	7	8
’ / !	b	c		d		e	i		s		f	g	5m space / 4m space	9 / 0
? / z	l	m		n		h	o		y	p	,	w	n quad.	m quad.
x / q	v	u		t		3m space	a		r		; / .	: / -	quadrat.	

PLAN OF LOWER CASE.

off. This is done with great celerity; the compositor grasps and reads several sentences at once; and without again looking at the letters, his nimbly flying fingers deposit them, one by one, here, there, everywhere, in the square dens to which they belong. Four thousand "ems" per hour can thus be distributed by a good compositor, which is about five times as many as he can "compose," or set in type; as it is much easier to spend money than to earn it.

Having filled the cases, the workman is ready to "compose." Standing in front of the cases which contain the Roman letters, and having placed the "copy," or manuscript from which he is to set, upon the least used part of the upper case, he takes in his left hand the "composing-stick," made of brass or iron, with a movable side which can be adapted to any width of line by means of a screw. He then commences putting the letters of each word of the copy, with the necessary points and spaces, into the stick, the thumb of his left hand meanwhile securing each addition, from left to right along the line. To facilitate the process, a thin slip of brass, called the "composing-rule," is placed in the composing-stick at the outset, and pulled out and put on the front of a line when completed. When the stick is full of lines, the compositor, with the fingers of both hands, lifts them out

as if they were a mass of solid metal, and places them in the "galley," — a flat board or piece of zinc or brass, having a ledge at the head, and on one or both sides. To do this last successfully requires practice and skill. And the young printer, although no adept in pastry-making, learns, to his disgust, that there is nothing easier than to make "pi," as the heap of jumbled type, which has slipped through his untrained fingers, is termed.

The galley having been filled by the contents of successive sticks, and the requisite number of pages to form a sheet being completed, they are arranged upon a bench or "imposing stone," and surrounded with pieces of wood, or "furniture," so as to give a suitable margin for each page. The whole being then secured in the "chase," or iron frame, by means of strips of wood and wedges. This is called "imposing."

Next, a "proof" is taken by impressing paper upon the type, that the compositor may see and correct the mistakes he may have made in putting the copy into type.

Referring again to the engraving, "Composition room," in the open space are the "imposing stones," or "tables," on which matter in type is placed in order to arrange it for printing; proofs are taken, errors corrected, and the "form" finally made ready for the press.

But in this cozy, well-lighted room, sits one whose attitude is the picture of careworn and earnest attention. No matter what the din in the building around him, his faculties are concentrated on the pages of proof. It is one of the proof-

Reading Proof.

readers, — and an assistant who reads the copy, whose office it is to see that the work goes forth to the public correct in literary and mechanical execution. His is a wearisome and responsible task. His eye, with lynx-like vigilance and mi-

croscopic power, must detect the minutest defects of press or author. Faults in punctuation, grammar, rhetoric, logic, and data he must point out. All this at a glance, in an establishment crowded with work.

XXII.

Type-setting by Machinery. — Its Practicability. — Various Machines devised. — The Brown Type-setter and Distributer described. — Simplicity. — Reliability. — Speed.

IN the last chapter we described type-setting by hand. Let us now for a few moments look at the method of doing this by machinery. This is the last achievement of that inventive enterprise which we have seen to be so efficient in all the history of the art; and it deserves some mention here, both for what it already is, and for what it so confidently promises. On witnessing this most interesting and curious operation, one wonders, first, that such a work, apparently requiring the constant exercise of mind and intelligence, can be so rapidly and perfectly done by machinery; and then, observing the simplicity of the instruments and the certainty of their work, one wonders again that it has never been done before.

It is our aim in this history to illustrate the prominence machinery has held in the several de-

partments of the art, and how much our literature and books owe to its aid; and it is remarkable that this work of setting and distributing types is the only branch of the printer's art which has not yet received its share of aid from labor-saving expedients. When we consider the great improvement which has been made in presses within the past few years, whereby the number of impressions is multiplied from 250 to nearly 30,000 per hour, and when, on the other hand, we consider that in the department of type-setting these four hundred years have brought no advance or improvement, but that this work is done in precisely the same slow manner in which the inventor of movable types first ranged them into line in the fifteenth century, it is strongly suggested that the contributions of genius have not been altogether impartial and just, and that here remains a great field of inventive enterprise as yet uncultivated. And when it is further considered that in the estimate of our most extensive publishers full half the present cost of our books and periodicals is in the labor of setting the types, the question urges itself, How has it happened that this important branch of human industry has been so overlooked by inventive genius? Is there any inherent difficulty which makes it impossible to do the work of type-setting by mechanical appliances? The wonderful adaptation of ma-

chinery to all other forms of human labor and service suggests antecedently that it must be possible also here. Led by this faith in the possibility of the thing, and urged by the actual necessity of doing something to expedite this branch of the work, many inventors have of late years been studying upon this problem. But the mechanical type-setter is essentially a modern invention: it is the contribution of this age to the art. About twenty years cover the whole period of these efforts. It seems to be a law of human progress that a number of failures must precede the successful effort, every failure contributing its quota to the ultimate success, either through its suggestions of a better way, or by serving as a warning and indication how *not* to do it.

Several type-setting machines have been devised, some of them very ingenious; but one after another failed to stand the test of actual work. It is not, however, half so strange that many should fail as that any should succeed in so great and delicate a work. So vast and difficult is the problem, that many of the best mechanicians of our day, whose knowledge of the capabilities of machinery gives their judgment peculiar weight, have pronounced it an impossibility, and have classed these efforts with the fascinating but visionary chase after a method of perpetual motion. But inventors are a

peculiar race, as is seen in the case of Gutenberg, especially endowed with an indomitable faith in the possible; and they are continually attempting and doing things with little other apparent motive than the fact that the world has supposed them impossible.

The inventor of the machines we have examined, Mr. O. L. Brown, of Boston, has made a careful study of the subject for years, and seems finally to have found the secret, both of simplicity and success. Especially is the device for setting the types so simple that it might perhaps more properly be called an instrument than a machine. The Type-distributer strikes one as more curious and wonderful, inasmuch as it is entirely automatic, and is operated by steam; but it is an adaptation of one of the most common and familiar mechanical principles.

The Type-setter comprises a case, a stick, and a justifier. The case consists of a series of grooves or channels ranged side by side, each just wide enough to receive a line of type. There is no limit to this case, either in the number of channels, or their length. In these channels, the types stand upon their feet, and the case is set at such an angle that they slide downward by their own gravity, and rest upon the bar which closes the lower ends. Across the foot a shield is placed, provided with openings for the types to pass through as they are

set; and an index, showing the letters and sorts which the case contains. Corresponding openings in the rear allow the tongue, which forces out the letter, to enter.

Below and in front of the case, sliding back and forth upon a track at the will of the operator, is the stick, or mechanical hand, which takes the letters from the case. The stick consists of a semicircular groove for receiving the type, and a lever or key for operating it. The uppermost end of the stick forms an indicator, pointing to the index upon the shield. The key is provided at one end with a tongue, or plunger, for lifting the type, and the other forms a handle for working it. The whole weighing but a few ounces, it is moved with the greatest ease from letter to letter. The operator, seizing the handle with the thumb and finger, runs it nearly opposite the letter to be taken. It is so arranged with an adjusting gauge that no greater accuracy of stroke is required than in playing a piano. As the handle of the key is depressed, a type is thrust out into the stick. As the handle is raised again, a "follower" pushes the type just lifted sufficiently down the channel to allow the next one to be taken in the same way. This operation is repeated till the stick is full, when it is run to one end of the track, and the line slipped into the justifier. The stick is then ready for an-

other line; and, when several are set, they are justified by hand.

In all machines that have heretofore been produced, use has been made of a set of keys to take the letters from the case; and at first thought these would seem to have an advantage over this with its single key. But experience has proved it otherwise; for the object is not merely to take the letters from the case, but also to form them into line; and this last has hitherto proved the most difficult and expensive part of the work. A case capable of holding one hundred and fifty lines of type the size of this in which this book is printed is about thirty inches in length; and when one letter is taken from one end of the case and the next from the other end, the difficult thing is to bring them together into line quickly, surely, and with perfect safety. It will readily be seen that in this passage there is likely to be loss of time, and the types are liable to misplacement, and, in the case of the more delicate, to breakage. That nothing is gained by multiplying the keys, will at once be seen when it is considered that the keys, however many there may be, must be struck singly, and time allowed for disposing of each letter as it is indicated. The operation of type-setting is not like that of playing the piano, where several keys are struck simultaneously; but, on the contrary, care must be taken

not to touch more than one at a time. In short, that nothing is gained, but much is lost, by this multiplicity of the keys, becomes apparent when we consider the complication which it involves. The machine we have seen in operation contains one hundred and fifty letters, and uses but one key; and this key is of the simplest construction. The motion of the key which lifts the letter puts it also in its place in the line. If stationary keys were employed, a key would be required for each letter, which would increase the first cost a hundred and fifty times, and the liability to get out of order in the same ratio, besides making a machine more difficult to learn, and without increasing the speed. But the advantages of the single key are found to be many besides its simplicity and cheapness. It allows the use of any number of different characters, it is not liable to get out of order, its parts are all in plain sight, and it is limited in speed only by the skill of the operator. One of its greatest advantages is that the line of type being set is always before the eye of the compositor. He is constantly observing the process of its formation; and there is therefore no occasion for the "outs" and "doublets" that are so frequently made in the machines that carry the line away from the operator's sight.

This Type-setter was brought to perfection several years ago; but the necessity of a distributing

machine was soon realized. In the setting of types by machinery, it is needful that they be ranged in lines, instead of being laid in boxes, as for hand-composition. To do this by the slow process of hand-distribution would more than counterbalance the time gained by the setter. It was first attempted to employ cheap labor for the work; but this was not satisfactory, and was soon abandoned. For the full utility of the setter, therefore, some method of distribution is imperative. Consequently Mr. Brown sought among the distributers already projected by other inventors something that might be adapted to accompany his setter. But a careful examination of everything that had as yet been produced found nothing that promised to be satisfactory; and he turned his attention to the only remaining expedient, namely, to create a new one. After five years of study and labor, he produced a distributer which, for simplicity of design and reliability of action, is a fit complement and companion for the setter.

The Type-distributer consists of a rotating ring, about ten inches in diameter. At regular intervals in the edge of the ring are recesses for holding the types while being carried to their places. Radiating from this ring are the channels into which the types are distributed; and which, when full, are transferred to the setter, and constitute a part

of the case. At one side is a galley, which receives the page to be distributed. From the galley, the machine takes one line at a time, and lifts it into a channel, in which it is fed towards the distributing-ring, but a little below. From the inner end of this line the types are lifted one at a time, and enter the distributing-ring. This ring has an intermittent motion, and each motion brings one of the recesses directly over the line. One after another the types are forced up into these recesses. A recess is large enough to receive the largest type, and is formed by cutting a larger slot in the ring, and inserting a set of levers. The levers are simply straight pieces of sheet brass or steel about two inches long, with a hole near one end, through which the pin passes on which they turn. These levers, placed one upon the other in sets of six or more, form one side of the recess. A slide or ejector, which forces out the letter when it arrives at its proper place, forms the back of the recess. When a letter is fed into the ring, it stands in this recess, and any nick that may have been made in the edge of the type will be opposite one of the levers. As the short arms of these levers shut against the edge of the type, some of them entering the nicks, the long arms take a corresponding position. It will be seen that a slight variation in the position of the short arms gives a much greater

variation in the long arms. The relative position of these long arms, acting in connection with the keys, determines where the type shall be ejected. These keys slide out and in, and each motion of the ring brings each set of the levers successively in front of each key. The keys all advance a short distance, and try the ends of the levers; and, wherever the shape of the keys corresponds to the position of the levers, the key advances farther, and, acting upon the ejector, forces out the letter. The operation is on the same principle as the common lever-lock; the levers with the type forming a certain combination which will move around until it arrives opposite its own key. The lock will then be unlocked, and the letter forced out. The keys are the slides, which are placed in the stationary part of the machine, inside the rotating ring, and radiating from the centre.

The type are placed in the machine just as they come from the press, the galley being adjustable to any size of page; and any letters that the machine cannot distribute are simply transferred to the "pi-line," where they stand in regular order, and can be distributed by another machine or by hand. The type used is the common type cast at our foundries, as described on page 225. For the setting-machine no change is made, but for the distributer, this being automatic, it is prepared by a

simple system of nicks in the back of the letter. These nicks are added very quickly and cheaply; but this necessity will soon be obviated, as the foundries are already making matrices or moulds for casting founts of type containing the distributing-nick.

The question which will doubtless decide the fate of this and all other machines for the purpose is the question of speed.

The machines we have described, notwithstanding their newness and the necessary inexperience of the operators, make an economy of more than fifty per cent. in the time of doing a given amount of work. The distributer, being run by steam and tended by a boy, does the work of several men. This is a great gain; twenty-five per cent. has been thought an amount very desirable to be reached. It seems, too, that skill in operating the setter is easily acquired.

As an illustration of this, may be given the case of a young girl who had never seen the inside of a printing office, and who was induced to try the new machine. She was initiated into the ready use of the type-setter in five minutes' instruction. Seizing the mechanical hand, which takes the letters one by one as rapidly as thought can spell from the groove-like case, in the first hour, with the rapid click, click, of the new-found "key," she

set very correctly six hundred ems, and in the second hour accomplished the task of a thousand ems.

An office boy was as successful. After a few hours' acquaintance with the machine, it is common for mere children, in dispatch and correctness of execution, to rival workmen who have had long experience in type-setting by hand.

The setter has been operated in competition with two superior compositors of many years' practice, and has done more work than both, on fair and equal terms. Such being the results in the present condition of the machinery, it is only just to conclude that this is an invention which not only does honor to the art, and is an important step in its progress, but must contribute materially to the cheapening of books and the dissemination of literature, and so serve the highest interests of human life.

STEREOTYPE FOUNDRY.

XXIII.

Stereotyping. — Plaster Moulds. — Planing and Beveling. — Correcting Stereotype Plates. — Process of Electrotyping. — The "Guillotine." — Ornamenting.

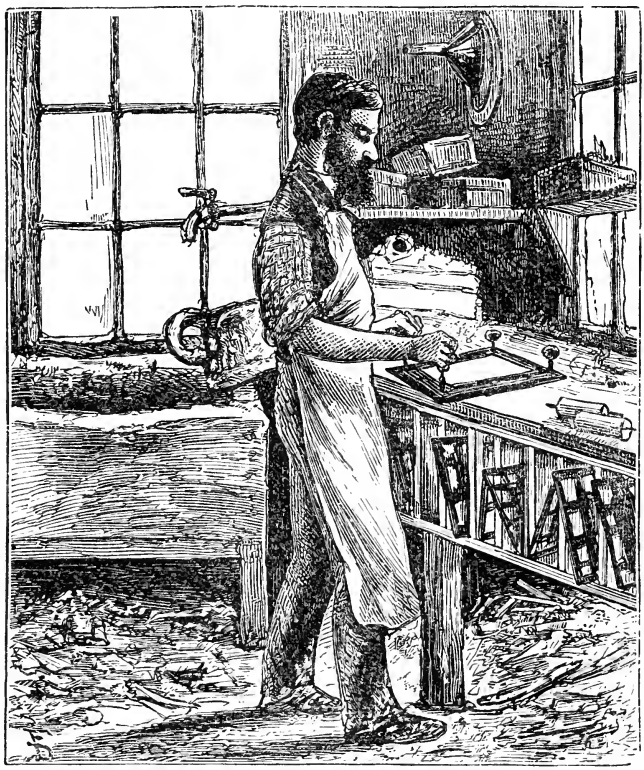
THE invention of stereotyping is also a great improvement in printing. Almost all works, after being put in type, are stereotyped; the advantage is that a new edition can be struck off as often as called for, without the labor of resetting the type.

The process of stereotyping differs from common printing, in that the letters, after being set up, are cast in plates of entire pages, from plaster of Paris moulds.

The workman in the picture is about removing the moulds from the type beneath. The mould, forming a perfect *fac simile* of the page intended to be printed, is placed with others in a great oven, where it is dried and baked hard. The edge of the oven can be seen at the right of the picture on the following page, which represents the interior of the Stereotype Foundery.

While the plaster mould is baking in the oven,

the foundery man is getting things in readiness for converting it into lead. Upon the left, in the picture, is a high pile of bars of lead, looking like an irregular chimney. When the bars of lead are put into the cauldron to melt, a certain amount of anti-



Moulding in Plaster.

mony is put in also, to render it brittle, and tin is added to give a brightness of surface. When the lead, antimony, and tin are well melted, and the scum has been removed, the composition is poured into iron moulds, where it hardens, and

comes out in the shape of the lead that was put into the kettle in the first place. These bars of composition, lead being by far the largest material, are put into the boiler over which you see the man working, and melted again, making a molten mass, which is kept liquid by the hot fire beneath and the frequent stirring. When the plaster pages, or moulds, are well baked in the oven, they are ready to be plunged in their lead bath. An iron pan about two feet long, a foot broad, and two or three inches deep, is the vessel, in which is laid a false bottom of iron, called a floater; on this are laid the plaster moulds, face down, and the whole is covered with an iron slab, which does not, however, rest on the plaster moulds, but upon the edge of the iron pan. An iron handle, like that of a basket, is secured to the middle of the pan upon the wooden stand in front of the picture. A crane overhangs the boiler, and from it drops a hook surrounded by four legs; the hook takes hold of the hole in the handle, and the four legs press upon the iron cover of the pan; the crane swings round, holds the iron pan with its plaster moulds snugly shut up in it, and suspends the body over molten lead, lowering it until it is partly sunken in the lead but not wholly plunged in it.

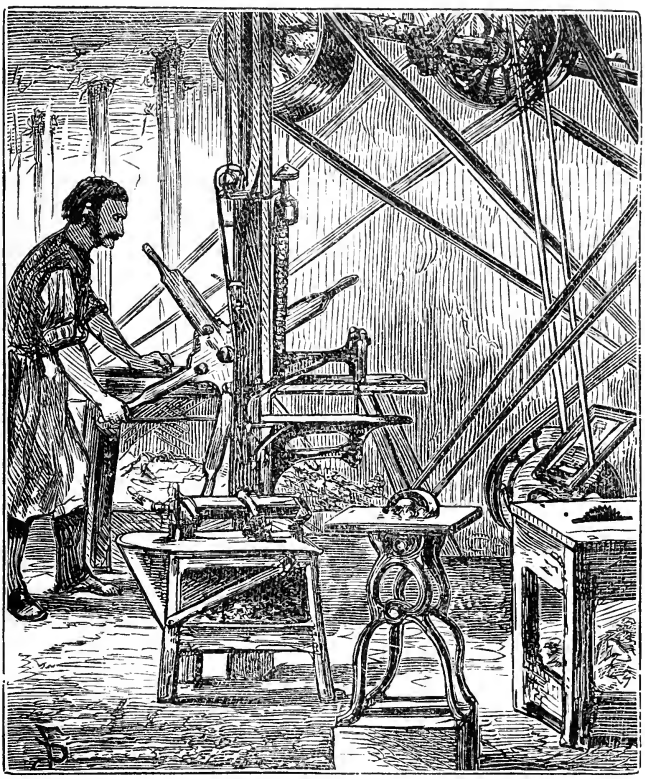
The four corners of the pan are not square; and as the iron cover does not fit into the grooves, there

is access to the interior of the pan by this means. Down them, then, the founder pours the lead, dipping it from the boiler, until it fills up completely all the little type openings in the plaster moulds. Then the crane lifts it and swings it over to the trough by which the boy is standing. It is lowered into the water to cool, after which a crane swings it over to the wooden standard, where one is waiting to be opened. The handle is removed, and then the founder, taking a heavy hammer, knocks off the lead at the corners and edges, where it has sealed up the iron lid on the pan. The cover is removed, and the contents of the pan taken out. The plaster is chipped off and thrown away; but now are seen lead plates of the size of the plaster moulds, having their surface raised in letters, just as that of the moulds was sunken in letters. The plates are about double the thickness of the slates used in schools.

These plates are cooled, and washed free of plaster in the trough, — the boy in the picture is now doing this, — when they are ready to go into the finishing room, to be trimmed, planed, picked out, corrected, and generally made ready for use in the printing-office.

In the first place, the plate is trimmed at the edges, and planed in a planing-machine, which shaves off, from the back, strips of the rough lead.

It is beveled also; that is, the edges are shaved down in the left hand of the three smaller machines shown in this picture: the object of the beveling is to secure the plate afterward, when it comes to be



Planing and Beveling.

put on the press. It is also picked out: a workman goes over the lettered surface with a sharp tool, clearing out letters which have accidentally become filled up with lead, and correcting all inaccuracies of form which he discovers.

The man at work in this picture is planing the

back of the plate again, for the purpose of getting the requisite thickness. The knife in this plane makes one shaving of lead, which rolls up as it leaves the plate, like any fine shaving. To take

Correcting Stereotype Plates.

off another shaving, a piece of pasteboard is placed under the plate, by which it is raised a trifle higher, and so again brought under the knife.

A proof is taken on a common hand-press, and with this proof before him the corrector marks such

letters as were overlooked when the plate was picked out. This proof goes into the proof-reader's room again, who now goes once more over the page, to see if everything is right; and after he has marked it, back it goes to the corrector, who now, with the printed proof-sheet before him, makes the corrections that are required. If, for instance, a letter is set up wrong, as *pan* for *pen*, and has been overlooked by the proof-reader, and the plate is cast, what is to be done?

The corrector takes a sharp tool, and punches a hole through the plate where the interloper is, just the size of the type, and then restoring a common type *e*, through the opening, cuts it off even at the back of the plate, and solders it in its place with lead. In this way a whole line of type is sometimes introduced for an incorrect line in the plate. The corrections being made, the plate is ready for the press. When not in use, the plates, being very valuable, are carefully put in a box, — a large book requiring several boxes. They are stored in fire-proof safes, made for this purpose.

While books are generally stereotyped, woodcuts are always electrotyped. Instead of being moulded in plaster, the cut or illustrated page goes into the electrotype room, to be moulded in wax.

Let us look at the process.

A brass case, or very shallow, oblong pan is filled

with liquid beeswax, which stands until it has hardened. The form containing the pages of type, well covered with fine black lead, is placed upon the bed of the press, shown in the picture ; the face

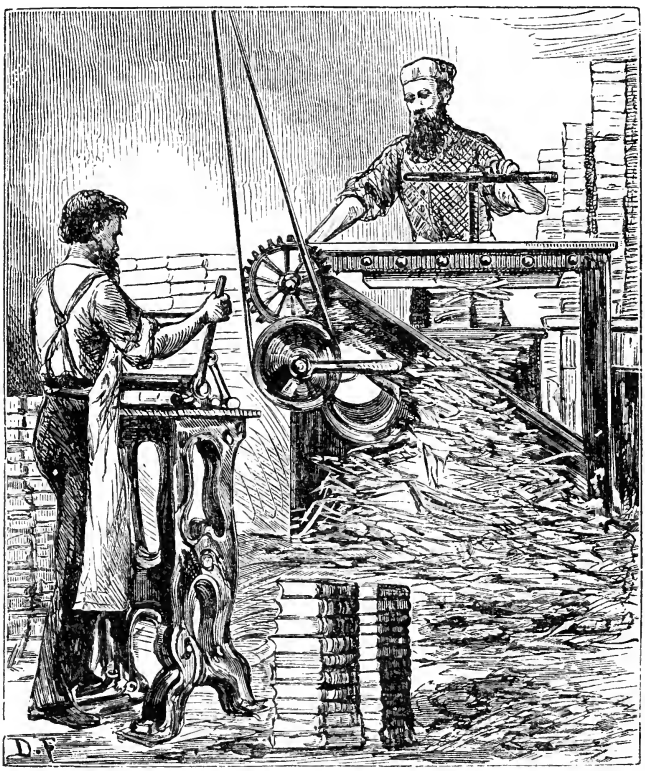
Moulding in Wax.

of the type is uppermost. There is an upper bed, which in the picture is swung half-way back. This is swung all the way back, and upon it is secured the brass case of wax. When the upper bed is brought back again, the wax face will of course be downward, and thus will be ready to receive an

impression from the form of type resting on the lower bed; this lower bed is movable, and is gently raised by a screw until it presses into the wax, after the press is tightened, and now the soft wax receives the exact impression of the type; and the upper bed being swung back, the brass case, with its wax mould, is removed. We have got just as far, in fact, as when the plaster in stereotyping was ready to receive the casting. In the battery, a corner of which is seen in the picture, are hung one, two, three, or more copper plates; and from rods running parallel are hung the cases containing the wax moulds, one being hung on either side of the brass plate facing it. The positive pole is attached to the case, the negative to the copper plate; and the connection being made, a thin film of copper appears on the surface of the mould. This coating increases the longer the mould remains in the battery. After ten or twelve hours it is removed, and the result is a shell, as it is called, of the thickness of thin pasteboard, the upper surface a perfect *fac simile* of the original page of type or wood-cut, every line, and every imperfection too, being reproduced. The under surface is exactly parallel; for each projection on the upper surface there is an indentation in the lower.

This thin shell of copper can be bent and crumpled up; it could not be used for printing in its

present state, and it passes through a process called "backing up." A thin coating of tin is applied to the back, when it is put face downward in a shallow dish, and kept in place by a number of small elastic rods. Then it is hung over a flat cauldron filled



The "Guillotine."

with melted type-metal, and lowered to rest in it. When the plate has acquired the same degree of temperature as the metal, the latter is ladled and poured over the plate, filling up all the hollows and indentations, and forming a solid back of lead.

The coating of tin is first applied, as lead will not adhere to copper.

The plate, being now ready for the planing, beveling, picking, and correcting of stereotype plates, goes through the same process that we have before described.

When a book is to be bound, the pile of sheets which form it is made even at the back, and a saw, working by steam, cuts shallow grooves across the back, for the twine over which the sewing is done. Two girls are pictured sewing at their frames, — passing the needle through the fold of the sheet and round the upright twine, adding one sheet at a time to the pile, until the entire book is sewed. In the large apartment called the forwarding-room, the remaining processes of finishing are done. The rough and uncut edges of the book are made smooth by means of a cutting machine called the "guillotine."

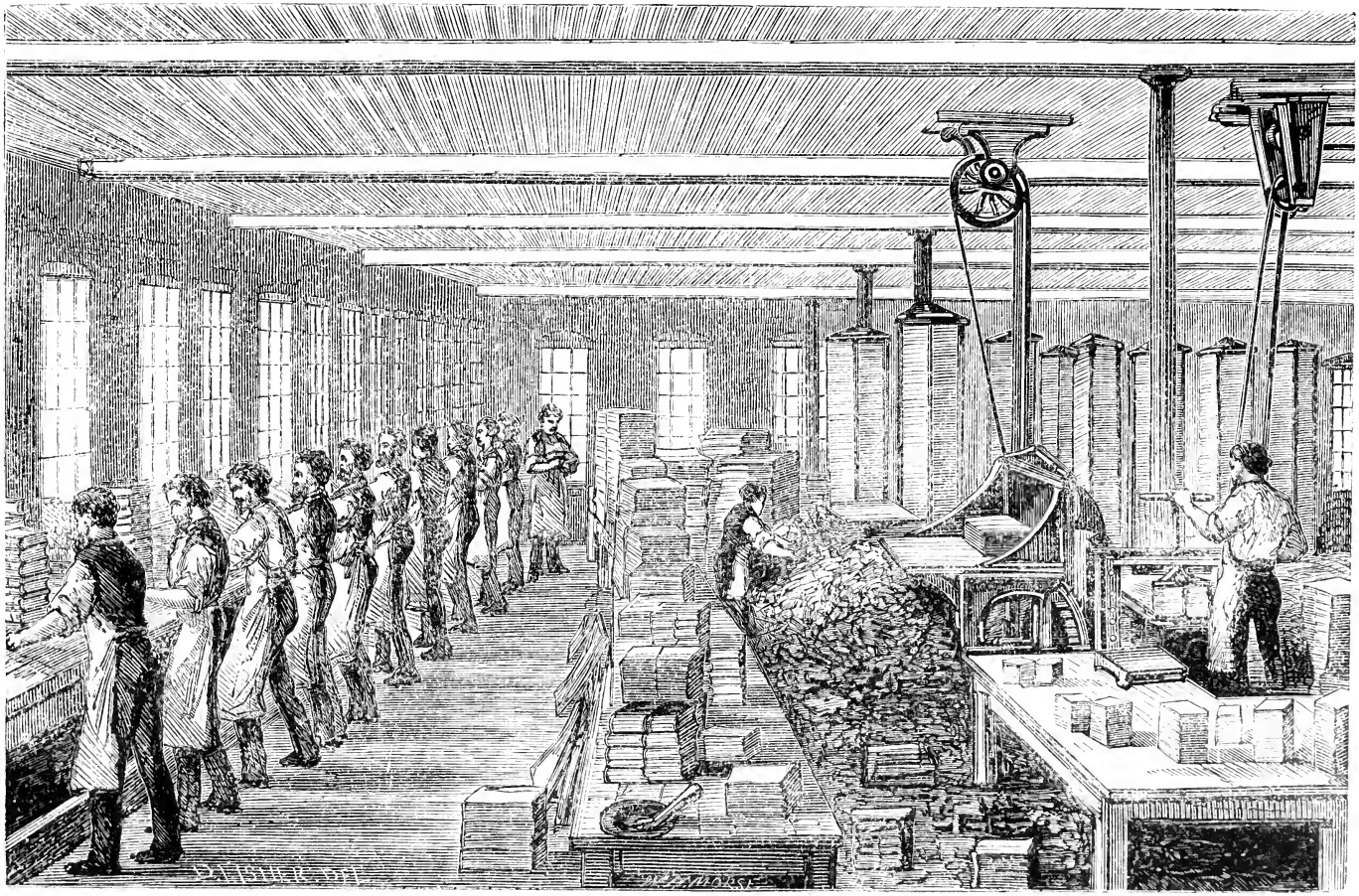
The edges of a number of books can be cut at a time, by being secured on a movable bed, which rises so as to bring them under a stationary knife, which cuts them smoothly as they are pressed against it.

There is also a backing-machine, for rounding the backs of books. The book is placed in a vise, and held near the edge of the back; and the man, working a treadle, moves a heavy roller over the back,

thus drawing up the sheets in the centre; this is that the cover may be made fast to the book, the sides of the cover fitting tightly; the limp back is like a hinge. The stiff pasteboard covers are made by themselves; for instance, if a thousand copies

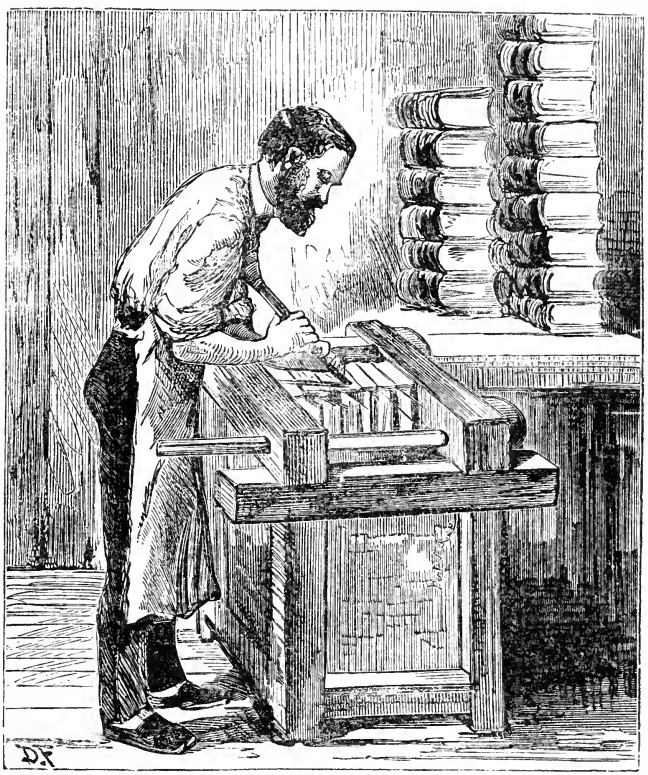
Laying on Gold Leaf.

of a book are to be made, while the folding and sewing of the thousand books is going on in one part of the building, in another two or three men are at work making cases; and when each is finished, they are put together.



FORWARDING ROOM.

But the stamped name on the back or ornamental work is done on the cases, after they are covered with cloth, and before the books are fastened into them. A brass die, or brand, is made of the title of the book; then the covers which are to be stamped are taken by the gilders, who first rub



Burnishing Gilt Edges.

the white of an egg over the surface to be stamped, and upon that lay thin gold leaf, of gossamer lightness.

In the picture three girls are laying on the gold leaf with their pallet knives.

The covers are now ready to be stamped by the brass die, and that is put in place in the embossing press, seen behind the gilders. It is kept constantly heated, and is attached to the upper part of the press with its face down; the cases are slipped singly into the press, and pressed up against the die, the letters of which stamp the gold into the cloth; the rest of the gold is carefully rubbed off, and collected and preserved.

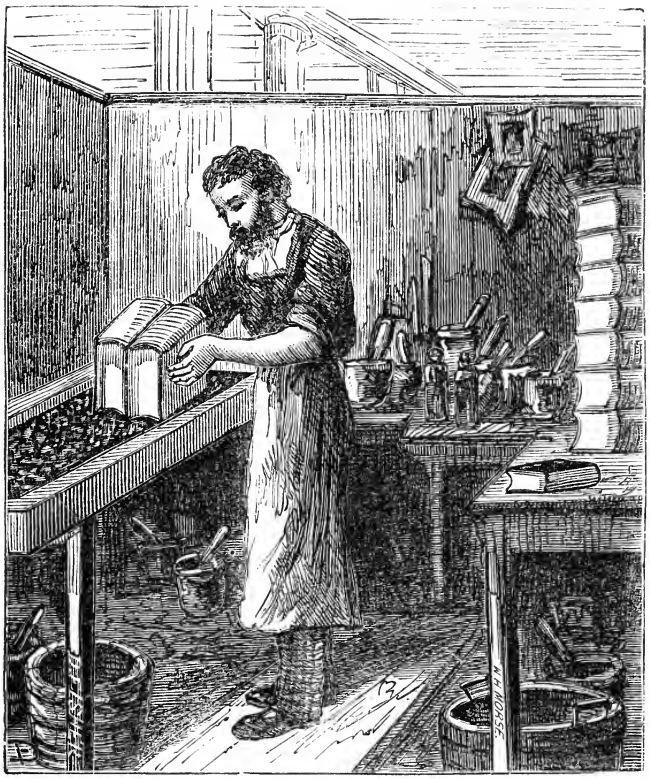
When the edges of the leaves are to be gilded, it is done by holding the books firmly in a vise, as seen in the cut, the gold leaf being laid on with a pallet knife; after which the surface is polished.

The workman is seen polishing the edges with an agate burnisher. The sheets having been pasted in their cases, and thoroughly subjected to a powerful press, are packed and put into the trade.

Another very curious process is marbling the edges of leaves.

In the engraving is a long trough, in which is a thin mixture of water and gum tragacanth, over which the workman holds two dictionaries in his hands. The colors which combine in the marbling are water-colors, and are distributed in the seven jars with brushes. The marbler shakes one of these brushes over the vat, the color falling is held

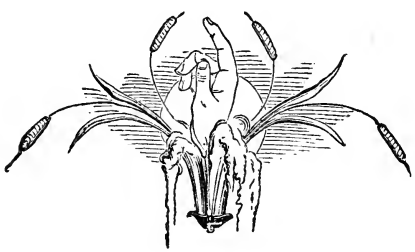
on the surface by the glue, and little circles of blue, or whatever was dropped, are scattered over the water; with another brush he sprinkles in the same way, and so on for any number of colors, producing effects as gorgeous as the mingling colors of au-



Marbling.

tumn leaves or of sunset clouds. If a piece of paper now were dipped into the trough, it would, when removed, be mottled or marbled. The marbling is elongated or streaked by slowly passing a coarse rake through the water. The marbler, tak-

ing two books, dips the edges into the trough; the gum causes the colors to adhere to the paper, and the precise pattern in the vat is elegantly painted on the book; the next is dipped in a different place, and when the surface has been taken up, the scum is skimmed off, and the colors again sprinkled on the water, and the process repeated as long as required.



XXIV.

The Hand-press. — Earl Stanhope's Press. — Improvements. — Cylinder Presses. — Press-room — Drying Room. — Sewing Room. — Elevator. — Books for the Blind. — Type, Press, and Paper invented. — Catalogue of Great Exhibition. — Estimate of Rapid Labor by Machinery.

WE have already referred to the earliest modes of taking the impression from the types by friction, or the rubbing of some hard smooth substance over the paper when laid upon the face of the types.

The hand-press invented by Gutenburg is the only machine absolutely necessary for printers. A specimen of these rude wooden machines is the press used by Benjamin Franklin, now in the Patent Office at Washington. A hand-press has been illustrated and sketched in this volume ; it was operated by two men, one attending to the inking, the other placing the paper, and pulling on the lever to make the impression. The first improvement on this press was made by Earl Stanhope in 1815. He built the whole of iron, and, substituting for

the screw an obtuse-angled jointed lever, greatly lessened the labor of the pressman. He also enlarged the platen to the size of the bed, so that a full sheet could be printed by one pressure of the platen, instead of two, as in the old press. A second improvement was soon made by G. Clymer of Philadelphia, who in his elegant iron press, the Columbian, used a combination of levers; in some points it is still unsurpassed. For country papers of limited circulation, the hand-press is still in use; it is also a favorite in book offices for work of delicate execution. It is now common to print by hand two hundred and fifty impressions per hour, or one hundred and twenty-five perfected sheets.

Near the end of the eighteenth century, the hand-press proving too slow for the demands of speed and economy, the ready intellect of inventors began upon the problem of moving presses by power. William Nicholson patented in England, in 1790, a plan for a press in which the types were adjusted upon a revolving cylinder, and were inked by contact with another cylinder having rotary motion. The ink was distributed by means of several inking rollers, the last of which was fed by the ink fountain. A large cylinder covered with felt, revolving in contact with the first, produced the impression, which was thus made by rolling the sheets of paper between the cylinders. Nicholson failed in fixing

the types to the cylinder; but had he been able to do this, his plan of inking would not have been practicable, as the gelatine rollers were not then invented. Frederick Hoenig, a Saxon, so improved this press of Nicholson as to make it a mighty engine. Himself and another machinist, A. F. Bauer, found that the way to make a bed of type work rapidly was to effect the pressure with a cylinder instead of a flat surface. A machine was secretly built; and on the morning of November 28, 1814, the "London Times" informed its readers that they were reading a sheet printed by steam, in these glowing words: —

"Our journal of this day presents to the public the practical result of the greatest improvement connected with the practice of printing since the discovery of the art itself. The reader of this paragraph now holds in his hand one of the many thousand impressions of the 'Times' newspaper which were taken off last night by a mechanical apparatus. A system of machinery almost organic has been devised and arranged, which, while it relieves the human mind and frame of its most laborious efforts in printing, far exceeds all human powers in rapidity and dispatch. That the magnitude of the invention may be justly estimated by its results, we shall inform the public, that after the letters are placed by the compositor, and inclosed in what is

called the form, little remains for man to do save to attend upon and watch this unconscious agent in its operations. The machine is then merely supplied with paper; itself places the form, inks it, adjusts the paper to the form newly inked, stamps the sheet, and gives it forth to the hands of the attendant; at the same time withdrawing the form for a fresh coat of ink, which itself again distributes, to meet the ensuing sheet now advancing for impression; and the whole of these complicated acts is performed with such a velocity and simultaneousness of movement, that no less than 1,100 sheets are impressed in one hour."

The line of success was inaugurated; and ten years later, the same paper says, "In consequence of successive improvements suggested and planned by Mr. Hoenig, the inventor, our machines now print 2,000 per hour with more ease than 1,100 in their original state."

By successive improvements made in this machine by Messrs. Applegath & Cowper, at length, in 1852, it could produce 11,000 impressions per hour.

Isaac Adams, of Boston, succeeded in making hand-presses work by power, and issued patents of different machines in 1830 and in 1836. The capacity of working slow for fine work, or rapidly for newspaper printing, characterized these presses, and made them favorites with printers.

It was reserved for an American, Richard M. Hoe, of New York, to make the first successful type-revolving press. After several costly unsuccessful attempts, in 1847 he produced a perfect machine, on the cylinder of which the types are held by friction, between beveled column-rules. This is styled the Lightning Press, and is in use throughout the world, where rapid printing is required.

Recently a new press, the Bullock, is spoken of as entering the lists with the Lightning Press. "It feeds itself from a roll of paper, cutting it into sheets, which are printed on both sides, and delivered in an even pile." Its future success or failure must decide its place in history.

It will be kept in mind that there are four things necessary in printing, — the page of type, or the stereotype or electrotype plate, to print from; the paper, to receive the impression; the ink, to exhibit this impression; and lastly the printing-press to press the paper upon the inked plate.

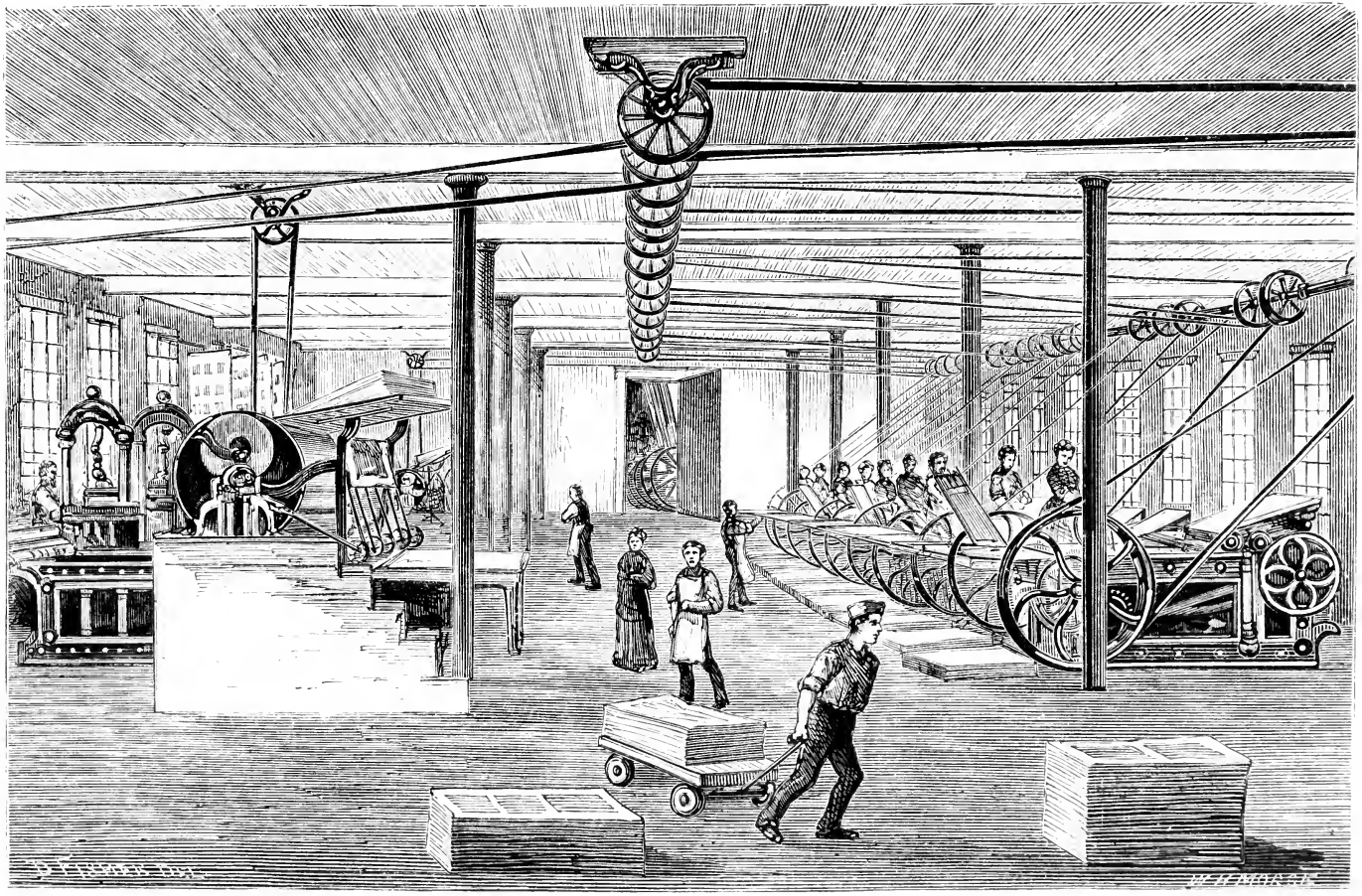
In our walk over the printing-house, let us step into the Press-room where book-work is done.

On the left, in the foreground, is a large cylinder press used for printing newspapers; there is another in the distance, and between can be seen parts of a number of hand-presses. On the right are great "platen" presses, that are kept in motion by steam-power. They are used for the nice

execution of book-work, and print only from six hundred to one thousand impressions an hour.

Let us watch the operation of one of these platen presses on the right. The paper, having been dampened and pressed, is laid on an inclined table on the press, from which the "feeder," as the girl by the second press in the picture is called, takes one sheet at a time, and places it upon an opposite inclined table, where it is clutched by the iron fingers of the press, and carried into the machine. If we stood near the press, we should see the bed of type adjusted with the face up, and long rollers brought quickly back and forth, evenly smearing it with ink. The iron fingers before mentioned as having grasped the edge of the sheet, lay it on the inked bed of type, where it comes under the platen, when the bed is raised up against the paper; the bed falling again, the force of the machine slides out the paper over rollers upon a light frame, which throws it over upon a board where the pile of sheets collects. This process prints the paper on one side only; turning the paper, the sheets are put through the press the second time, and the printing is completed.

But this and other departments of the art here pursued, give employment to hundreds of operatives of both sexes, throwing off annually many millions of impressions. Here rumbles the thunder of the

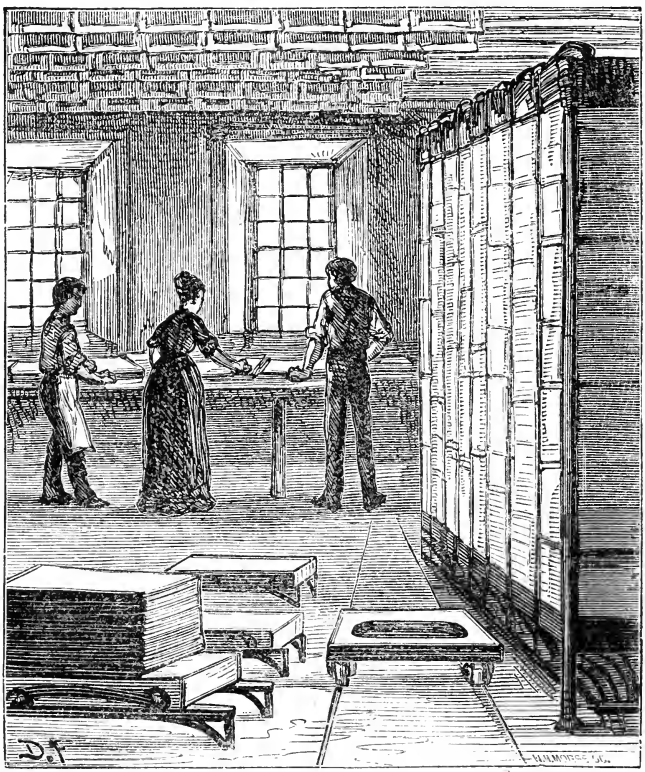


PRESS ROOM.

modern steam-propelled printing-presses. What a clangor is made by the simultaneous revolutions of so much complicated machinery! Broad leather straps, rapidly revolving in every direction, cause you to start back, fearful lest you be caught in their toils. And yet how docile, how easily managed, how orderly, how almost human in intelligence, — and with what lightning swiftness the monster steam-presses throw off their work, so that the eye can scarcely follow the successively printed sheets!

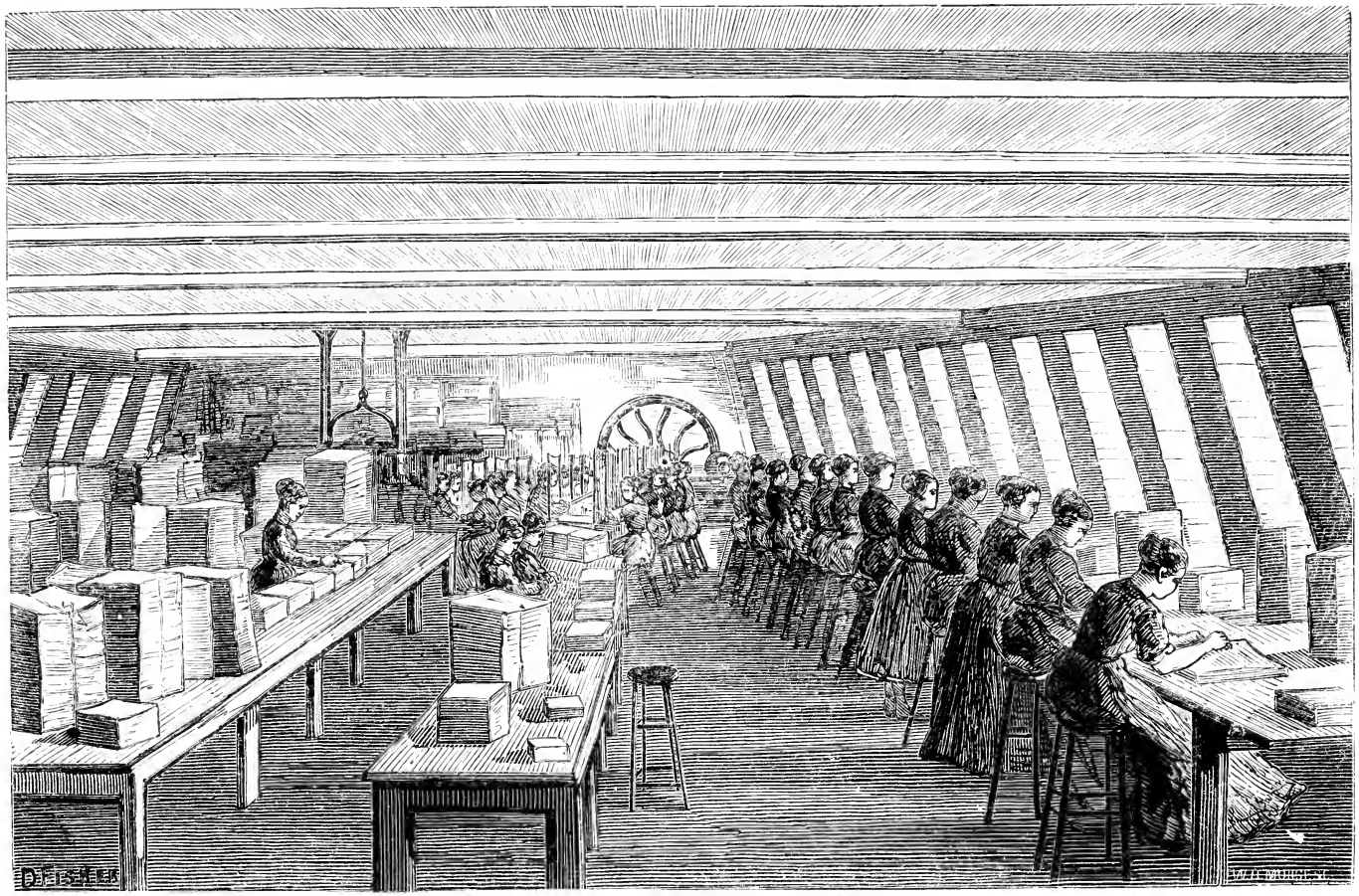
In the adjoining Stock-room, some two days before being printed, the paper is "wet down," or dampened with water, and then put under powerful screw pressure of many tons' weight, that the sheets in the process of printing may take a clear impression from the inked type. The paper, damp from the printing-press, is then taken on trucks and by an elevator to the Drying-room, and dried, that it may not tear or the printing be defaced. In the ceiling are immense frames with cross-bars, and hanging on the latter are the printed sheets drying. There is also a steam closet to be used during damp weather, and when it is required to dry the sheets quickly. Steam-pipes circulate in the closet, by means of which a high temperature is attained, and "no postponement on account of the weather."

Workmen are busy bringing in the printed sheets, and hanging them to dry, and removing those that are dried. The thorough drying of the printed sheets is most important.



Dry-press Room.

The three work-people seen in the corner of the Dry-press room, are engaged in laying the paper in piles, with a piece of stiff, highly polished pasteboard, of the size of the sheet, placed between them. The pressure upon this pasteboard flat-iron is to be given



FOLDING, GATHERING, AND SEWING ROOM.

by the hydraulic press. The sheets are placed in piles on trucks, that move upon a little railroad, by which they are conducted to the hydraulic presses, some of which are seen at the right of the picture, packed with sheets. Here they are put under powerful screw pressure of from one hundred to four hundred tons, and come out not only much dryer, but ironed smooth of wrinkles, and the indentations made by the type. Next, the pasteboard is removed, and the piles of sheets sent into the Folding-room to be folded.

It is interesting to mark some of the avenues of employment that printing has opened to women. The working force in this room is composed almost entirely of girls. Standing by the one at the right hand in the foreground, let us watch her rapid motions! With her simple paper-folder she skillfully folds each sheet once, and smooths the fold, then with like expertness folds this doubled sheet again, and firmly smooths the thicker fold with the ever-in-hand paper-folder; and once more she folds the compact sheet into one having eight thicknesses, or sixteen pages. This is book folding, and she is guided by the numbers at the corners of the pages, or *folios* — if these numbers meet, the folding is sure to be exact. In an adjacent room is that ingenious aid of modern printing — a rapid and dexterous folding-machine, which, had it been dis-

covered at work in Gutenburg's office at Strasbourg, would have been proof additional that he dealt in witchcraft.

But to return to our lady folders and their work. The sheets, as fast as they are folded, are arranged

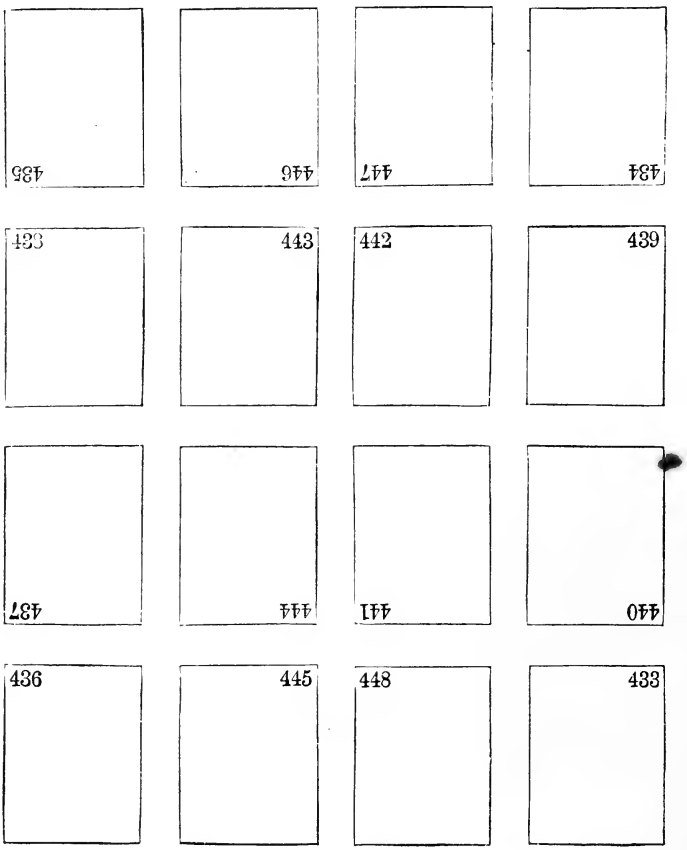


Diagram of Pages.

in piles upon the table, the girl who gathers the sheets together into separate books following the order of the *signatures*, or figures on the first page of each sheet.

At the left of our picture, near the middle of the room, is seen a gatherer, who is engaged in making up "Webster's Unabridged Dictionary." She is in a narrow isle between two tables, joined at the foot by a short one. On these three tables one half of

Sewing.

the Dictionary is spread out at a time, in one hundred and fifteen piles of sheets. She walks down this isle picking a sheet off each pile, and when she has gone the entire round she has gathered one half of the book. When these piles are all gathered,

the other half of the book is arranged, and gathered in the same way.

Next, the sheets of the book are put into the stabbing-machine, that three holes may be made at the inner edge, when the sheets are stitched together by hand.

The backs of magazines are covered with a strong paste, and the covers are then put on.

The elevator machinery connecting with each story, of a capacity for lifting two tons, worthily facilitates the immense work of the establishment, as with colossal strength it lifts great burdens of paper, type, machinery, and deposits them on just the floor where they are needed.

If the first printers could revisit the earth, with what interest would they make the tour of a modern printing-office! How would they call to mind their own narrow quarters, poor facilities, and creeping progress, contrasting them with the convenience, system, swiftness, finish, and grand results of to-day, in the now beautifully moulded and polished metal types, the success seemingly gained in setting type by machinery, and the comprehensive arrangements, of various perfected departments, all brought under the easy control of human skill! How unlike their own embryotic efforts "which gave to themselves fame, their art an existence, and civilization its motive power!"

The first introduction of printing into America was in Mexico, by the Jesuits, who issued a "Manual for Adults," in 1540. The first printing-office in America was established in Cambridge, Mass., in 1638; the first book printed was the "Bay Psalm-Book," in 1640; the first newspaper was the "Boston News Letter," published April 24, 1704.

The first attempt made to print books for the blind was made by the Abbe Hauy, at Paris, in 1785. The letters were so large, however, the paper so thick, and the books so bulky and expensive, that they were of little practical use. No improvement had been made upon this system, so late as 1830, when the Paris press was still lumbering on in the old method. A few years later a French author, a teacher of the Paris school for the blind, writes, "The Americans have effected a revolution in the art of printing for the blind."

It was Mr. S. P. Ruggles, the well-known inventor, who, by his genius and untiring industry, wrought this great change. He first turned his attention to the education of the blind in 1835 at the Perkins Institute, in Boston. For years he closely studied their wants and capabilities by constant daily observation of the pupils. Books were the first thing required; the few made being so cumbersome and costly as scarcely to be available.

In the emergency which calls for a hero, one is provided; and it is worthy of record that this man, to supply the famishing intellect of the blind, clambered up step by step the rugged height which Gutenburg had scaled, to give light to the seeing world.

After many experiments, he became convinced that he could produce a type of less size, and less height of face, which the blind could read with the greatest facility; providing the raised impression was hard and sharp, and the angles of the type adapted to the touch of the fingers. He finally succeeded in reducing the size of the type and the height of its face so as to place books, of comparatively small dimensions, in the hands of blind students and pupils. The size of the type now in use, the height, and peculiar bevel of its face, are his invention.

He next devised and built the first press ever made for printing for the blind. This was a very powerful machine, giving an impression of about three hundred tons to each sheet impressed, yet so contrived that the blind could do their own printing.

After succeeding in the making of the new kind of type, and in the construction of the ponderous press for printing, he was met by an unexpected difficulty. There was no paper in the market

adapted to this kind of printing or embossing. That which was hard enough would crack and break through when printed; and that which was flexible enough not to crack, would flatten down when pressed upon by the fingers of the pupils when reading. His reduced type required a new kind of paper. The peculiar and definite bevel, and height of face of the type, and the texture of the paper printed on, were most intimately connected, and it took a long series of trials, in the manufacture of paper, to get them so harmonized as to work well together. But at last, after many experiments with gums and gelatine, he produced the article required.

His new method of making books being perfected, Mr. Ruggles next invented an entirely new map for the blind. It was made with a raised character, similar to his type; but arranged with such combinations that, at a trifling cost, he could produce a succession of maps of any size. Maps made in this way were never before known, and the Perkins Institute immediately issued, from this plan, an "Atlas" of the United States, and also a "General Atlas." It would, by most persons, be thought impossible that separate type could be so contrived as to admit of their being arranged in such a manner as to produce a map of any country and then to use the same type to make a map of any other country.

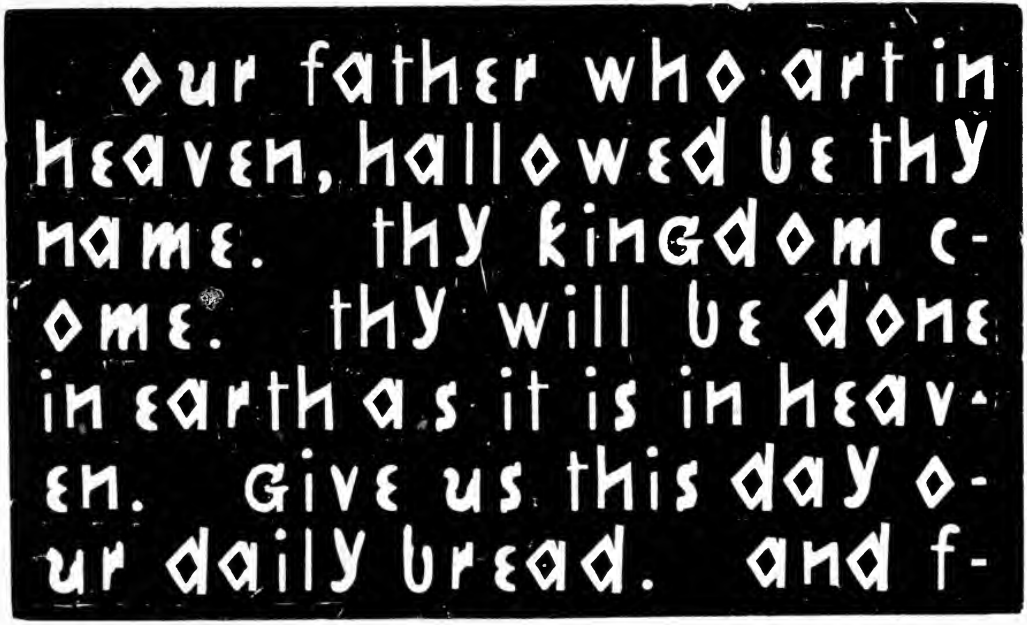
Yet all this was perfectly accomplished by this new invention — every piece of type matching its neighbor with miraculous cunning, while following the crooked lines and angles, or graceful curves of rivers, coasts, and islands, with which such works abound.

He next produced the plates for a book on geometry, on a plan similar to his maps. These works proved very valuable and interesting to the blind — for with them they could pursue their studies without the assistance from seeing persons, which, before this, was necessary.

In 1838 this gentleman went to Philadelphia, and established one of his powerful presses for printing for the blind in the Institution in that city; and a year or two later placed another press in the Institution for the Blind in the State of Virginia. The perfect success of his method for reducing the size and expense of books for the blind, inaugurated a new era in the history of this kind of work, and the books were rapidly multiplied throughout this country and Europe.

On the opposite page is given a specimen of the types referred to, and which are now used for printing for the blind: the face, or white part of these letters, being raised in their books about one fortieth part of an inch above the surface of the paper.

Steel-plate and copper-plate printing, together


our father who art in
heaven, hallowed be thy
name. thy kingdom c-
ome. thy will be done
in earth as it is in heav-
en. Give us this day o-
ur daily bread. and f-

RAISED TYPE FOR THE BLIND

with the lithographic process, are modern inventions; but our limits confine us to glance only at a part of the processes used in the preparation of books.

An illustration of the perfection to which the art of printing has been brought, was given in the printing of the catalogues of the great Exhibition of 1851. The Exhibition opened on the first of May; yet with all the speed that could be made, it was not till midnight of the 30th that the catalogue, a closely printed volume, was ready to go to press. By the next morning, however, a bound copy was presented to Queen Victoria. Twelve trades were necessary for the production of this catalogue. And so large an edition was issued that thirty-seven tons of new type were employed, of which amount twelve tons were manufactured in the short space of six weeks! Twenty-seven thousand reams of paper were used, while the ink required for the small catalogue alone amounted to 4,000 pounds. Specimens of typography were also exhibited from the imperial printing-house of Vienna at this Exhibition. About 500,000 sheets, or 1,000 reams, of paper per day are required for the consumption of that establishment.

A French paper makes a calculation to show how marvelously human labor is outrivaled by the mechanical arrangements of the steam press. The

paper, "La Patrie," contains about 4,230 lines: 8,000 copies make 34,560,000 lines. A clerk could write about three lines in a minute; therefore it would require 11,520,000 minutes, or 192,000 hours, for a single clerk to supply 8,000 copies of "La Patrie;" in other words, it would require 192,000 men to supply, by copying, the same amount of paper which the cylinder printing-press supplies in one hour.

What great armies of compositors are at work in the printing-houses of Christendom! What numberless presses by night and by day throw off multitudinous papers, pamphlets, and books, which are scattered to every home, business mart, and travelling conveyance in the land.

At the Great Exhibition one Bible Society alone had specimens of the Word of God printed in one hundred and twenty different languages. And a single religious publishing society of London, as early as 1862, had issued five hundred and seventy-six millions of copies of its publications. But that is only one of many societies of similar character, and moreover, every enlightened nation abounds in book and periodical publishers and booksellers.

XXV.

Time of the Great Invention. — A First Gift. — The Use of the Alphabet. — A New Era. — Royal Printers. — Knights of Type and Pen. — A Mighty Engine. — Gutenberg's Dream. — The Press mighty.

IF the "undevout astronomer is mad," what shall be thought of the unbelieving observer of God's dealings with the human race? If evidences of infinite design appear in the material bodies that people space, can we think that God has stamped his creating, ordering hand less distinctly on the affairs connected with the progress of the souls for whom all things exist? The needle pointing to the pole helps on navigation; it is the servant of the seamen: without it, what would commerce do? But how happened it that the principle of the mariner's compass was discovered just when in the turmoil of events it would be most useful — when it could suitably and most effectively introduce the old to the new world? How providential, too, the time of the invention of the art of printing! Had it

been much earlier, the materials for writing were so scarce that it must have come to naught. Had it been deferred, doubtless many works which we prize as among the most valuable and excellent would have been lost. In less than a half-century from the invention of the wonderful art, the continent of America was discovered by Columbus, in 1492. In less then a century, Copernicus discovered the true theory of the planetary motions; and, shortly after, only a few years intervening, he was succeeded by the three great heralds of Newton, — Tycho Brahe, Kepler, and Galileo.

Man is above nature. The senses only, do not constitute man; for the brutes have some senses like us, and, not seldom, stronger, more delicate, more subtile, quicker to act, more infallible. It is *thought*, then, that gives man the preëminence. But what if thought could never be expressed? What if the members of the human race could never discover thought to each other, never reveal what passed within the mysterious and mighty laboratory of the mind only as the infant seeks to make its wants known, by gestures and moans and "inarticulate cries?" But the Creator gave man speech; God's first grand interposition for the soul was the gift of speech! "We believe," says a brilliant French writer, "that speech was not born of itself on the lips of primitive man," as some

affirm, "like a stammering of chance, attaching, from age to age, certain vague significations to certain inarticulated sounds, and giving to others, by the sound and connection of these human cries, lessons which he who uttered them had not himself received. To reach thence from these instinctive cries to speech; from speech to the unanimous agreement of the meaning of words — of the sense of certain words to the verb and phrase — of the verb and phrase to logical syntax — of this syntax to the language of Moses, David, Cicero, Confucius, Racine, it is necessary to suppose more ages of existence to the human race on this earthly globe than there are stars, visible and invisible, in the Milky Way. It is necessary to suppose numberless ages of stupidity during which the human race, essentially moral and intellectual, should vainly search, like the brutes, its *instrument* of morality and knowledge, without power to find it only after myriads of generations. Humanity deaf and mute during a hundred thousand years! I shudder at the blasphemy of believing such a mystery. I love better to believe in the other; that is to say, in the fatherly mystery of the Creator himself, inspiring on the lips of his infant creature, speech; the word, the sentence, the inborn expression, which at sight gave things names appropriate to their form and nature."

And when we consider how necessary the use of language is to the convenience, comfort, and progress of man, and that man had at once conferred upon him a body "curiously and wonderfully made," and a mind capacious, active, strong, and penetrating, can we harbor the idea that after his creation, God left him, — a perfect, full-grown being, the noblest of his works, and the lord of nature, — without speech? Rather must we not infer, with a distinguished writer, that "the same Divine Author of the physical organs of speech imparted to man the knowledge of their use and power"?

But speech carries thought from the mouth to the ear by sound, and then perishes like the medium which conveyed it there. There needed to be, therefore, a process to *preserve* thought, by reducing it to material signs on some enduring substance. So writing was given to the world. And the wonderful discovery of alphabetical writing, how did it come about? By chance? by human ingenuity? or through the "fatherly mystery of the Creator inspiring it" in man? Says the learned Shackford, "That men should immediately fall on such a project, to express sounds by letters, and expose to sight all that may be said or thought in about twenty characters variously placed, exceeds the highest notions we can have of the capacities with which we are endowed." How difficult to

submit our reason to the theories which have been argued of a *gradual* construction of alphabetical letters! Is it reasonable to suppose, for example, that the old Shemitish letter D was suggested by the word *door*, or the letter H by the word *fence*, and the V by a *hook* or *nail*? Do we not find evidence, that alphabetical writing was divinely revealed, in the tables of stone written by the finger of God and given to Moses on the Mount? In those ten commandments so anciently bestowed, all the Hebrew letters, with one exception, are found — every guttural, labial, lingual, and dental is disclosed. Some quote the Chinese as leading the way in imprinting language. But their writing was hieroglyphical, they did not reach alphabetical writing, and they use one hundred and twenty thousand characters to express thought.

But whether writing, which has well been spoken of as "nearly divine," is the invention of man, or is truly divine in its origin, its possession was a great step in human progress. By it speech became enduring and universal; it could be preserved, it could be diffused. Poetry, history, science, law, art, religion, thus found expression for all time. Through it we commune with the thinkers of antiquity. By its aid "the Book" has come down to us. Nevertheless, this mode of transmitting knowledge was slow, toilsome, costly,

and not available to the masses. At the beginning of the eleventh century, for example, books were so scarce in Spain that one and the same copy of the Bible, St. Jerome's Epistles, and some volumes of ecclesiastical offices, served several different monasteries. Books were the privilege of the wealthy and the powerful; and the common people had them not. "The head of society was in the light, the feet in the shade," and "the progress of truth, science, letters, politics, arts, was slow, and suspended through long periods." Some process was needed by which the written thoughts of the thinkers could be reproduced with greater rapidity, and thus placed within the reach even of the poor. This, John Gutenberg, in the good providence of God, gave mankind, in the discovery of printing. With the new art came a new era for the world. In a few years after Gutenberg's death all the capitals of Europe had their printing-presses. France, England, Holland, Germany, Venice, Genoa, Rome, Poland, seized the invention, and spread abroad religious and secular works. In 1500 the Jews published tracts on Rabbinical literature in Constantinople. And Russia, in 1680, established a press in Moscow.

The invention had its enemies, and printing its martyrs; but its glory could not be dimmed, nor its progress arrested. Kings and queens turned en-

gravers and compositors, glorying to labor with their own hands in the wonderful art. The wife of Henry IV. designed and printed cuts for some royal publications, and engraving with her own hand a figure of a young girl, presented it to "Philip de Champagne." Louis XV. in his youth, printed in his own palace a "Treatise on European Geography." The chief printers of the times succeeding that of Gutenberg were often the artists, the learned men, the writers. They not only reproduced the buried works of antiquity, but were able to explain and interpret them.

The Emperor Maximilian ennobled the printers and compositors of the new art, authorizing them to wear robes braided with gold and silver, such as the nobility only had the right to wear, and giving them, for a coat of arms, an eagle with wings extended on the globe, symbol of free and rapid flight and universal conquest. Deserved honor! fitting symbol! What marvels has printing wrought. It has given elementary instruction to the masses, — putting into every hand, however humble or toil-worn, the printed page, multiplying books to teach, amuse, and elevate even the little child. It has reformed corrupt religions, fashioned and developed philosophy anew, and permeated laws with their true spirit. Before its magic touch, the old feudal despotisms of the dark ages have fallen, and

later and no less oppressive systems have wasted away. By its aid time and space seem annihilated, as "railways open to it routes, steam lends to it wings, and the electric telegraph gives it the instantaneousness of powder!" The "preserver of all arts," it broods over and perpetuates all useful institutions and discoveries; and trade and commerce are stimulated, guided, systematized, enlarged, and furnished with boundless facilities. But this mighty engine can be used for evil as well as for good, and strike like the thunder-bolt the best interests of man. The poet-historian from whom we have before quoted, illustrates this by a dream of Gutenberg's, which he is said to have related to his friends, and to have been translated from the German, at Strasbourg, by Mr. Garaud.

Gutenberg had succeeded in an important experiment. His success filled him with such enthusiasm that he scarcely slept the night following. In his troubled and imperfect rest he had his dream, — a dream so prophetic, and so near to the truth, that one questions, in reading it, if it be not the reflecting presentiment of a wakeful sage rather than the fevered dream of a slumbering artisan. This is the account or legend of this dream as it is preserved in the library of the counsellor Aulique Beck: —

"In a cell of a cloister of Argobast sits a man with a wan forehead, a long beard, and fixed look,

before a table, supporting his head with his hand. Suddenly he passes his fingers through his beard with a quick joyous movement — the hermit of the cell has discovered a solution of the problem he sought! He rises and utters a cry; it was as a relief to a long pent-up thought. He hastily turns to his trunk, opens it, and takes therefrom a cutting instrument; then, with nervous jerking movements, he sets himself to carve a small piece of wood. In all these movments there was joy and anxiety, as if he feared that his idea would escape, — the diamond he had found, and which he wished to set and polish for posterity. Gutenberg cut roughly and with feverish activity, his brow covered with drops of sweat, while his eyes followed with ardor the progress of his work. He wrought thus a great while, but the time seemed short. At length, he dipped the wood in a black liquid, placed it on parchment, and bearing the weight of his body on his hand in the manner of a press, he printed the first letter which he had cut, in relief. He contemplated the result, and a second cry, full of the ecstasy of satisfied genius, burst from his lips; then he closed his eyes with an air of happiness such as would befit the saints in paradise, and fell exhausted on a joint-stool; when overcome of sleep, he murmured, 'I am immortal!'

"Then he had a dream which troubled him. 'I

heard two voices,' said he, in relating it; 'two unknown and of a different sound, which spoke alternately in my soul. One said to me, "Rejoice, John; thou art immortal! Henceforth, light shall be spread by thee throughout the world. People who dwell a thousand leagues from thee, strangers to the thoughts of our country, shall read and comprehend all the ideas now mute, — spread and multiplied as the reverberations of the thunder, by thee, by thy work. Rejoice, thou art immortal! for thou art the interpreter whom the nations await that they may converse together. Thou art immortal; for thy discovery comes to give perpetual life to the genius which would be still-born without thee, and who, by acknowledgment, shall all make known in their turn the immortality of him who immortalized them!" The voice ceased, and left me in the delirium of glory. But I heard another voice. It said to me, "Yes, John, thou art immortal. But at what a price? Thought not unlike thine, is it always pure and holy enough to be worthy of being delivered to the ears and eyes of the human race? Are there not many — the greater number it may be — which merit rather a thousand times to be annihilated, and sink to oblivion, than to be repeated and multiplied in the world? Man is oftener perverse than wise and good; he will profane the gift that you make him; he will abuse the new faculty that

you create for him. More of the world, in place of blessing, will curse thee. Some men will be born with souls powerful and seductive, and hearts proud and corrupt. Without thee, they would rest in the shade; shut in a narrow circle, they would be known only to their associates, and during their lives. By thee, they will bear folly, mischief, and crime to all men and all ages. See thousands corrupted with the disease of one! See young men depraved by books whose pages distill soul-poison! See young women become immodest, false, and hard to the poor, by books which have poisoned their hearts! See mothers mourning their sons! See fathers blushing for their daughters! Is not immortality too dear which costs so many tears and such anguish? Dost thou desire glory at such a price? Art thou not appalled at the responsibility with which this glory will weigh down thy soul? Listen to me, John: live as if thou hadst discovered nothing. Regard thy invention as a seductive but fatal dream, whose execution would be useful and holy, if only man was good. But man is evil. And in lending arms to the evil, art thou not a participator in his crimes?"

"'I awoke in a horror of doubt! I hesitated an instant; but I considered that the gifts of God, though they were sometimes very perilous, were never bad, and that to give an instrument to aid

reason, and advance human liberty, was to give a vaster field to intelligence and to virtue, — both divine. I pursued the execution of my discovery.'"

Thus has the art of printing come down to us consecrated by the martyr struggles of a heroic soul. He died poor, able only to leave a few books to his loving sister, yet enriching all mankind by the fruits of his genius. "I bequeath to my sister," said he in his will, "all the books printed by me in Strasbourg."

But which of the voices that the legend represents as speaking to Gutenberg in his dream, shall prove a true prophet of the art? Shall its resistless power blast the world with error and crime, or bless the ages with truth and purity? "The first cries of the press," says a historian, "were praise and prayer." Let its utterances be for religion and learning, God and humanity; then welcome the hour when the earth shall be covered with its swiftly multiplying issues, "the leaves of the tree which are for the healing of the nations."

THE END.